



USAID
FROM THE AMERICAN PEOPLE

STRENGTHENING SUSTAINABLE ECOTOURISM IN AND AROUND NYUNGWE NATIONAL PARK (SSENNP) “NYUNGWE NZIZA”

IDENTIFYING INDICATORS FOR THE NYUNGWE NATIONAL PARK LIMITS OF ACCEPTABLE CHANGE FRAMEWORK CONSULTANT’S REPORT



JUNE 2012

This publication was produced for review by the United States Agency for International Development. It was prepared by DAI.

STRENGTHENING SUSTAINABLE ECOTOURISM IN AND AROUND NYUNGWE NATIONAL PARK (SSENNP) “NYUNGWE NZIZA”

IDENTIFYING INDICATORS FOR THE NYUNGWE NATIONAL PARK LIMITS OF ACCEPTABLE CHANGE FRAMEWORK

CONSULTANT’S REPORT

| | |
|---------------------------------|--------------------------------------------------------------------------|
| Program Title: | Strengthening Sustainable Ecotourism in and around Nyungwe National Park |
| Sponsoring USAID Office: | USAID/Rwanda, Office of Economic Growth |
| Contract Number: | AID-696-C-10-00002 |
| Contractor: | DAI |
| Date of Publication: | June 22, 2012 |
| Author: | Lane Krah |

Cover image: New handrails on the Waterfall Trail installed at the base of the waterfalls to improve visitor safety

The author’s views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States

CONTENTS

| | |
|--------------------------|----|
| CONTENTS | IV |
| ABBREVIATIONS | V |
| EXECUTIVE SUMMARY | 1 |
| 1. INTRODUCTION | 3 |
| 2. FINDINGS | 6 |
| 3. RECOMMENDATIONS | 10 |

APPENDICES

| | |
|-----------------------------------------------------------------------------|----|
| APPENDIX A: STATEMENT OF WORK | 13 |
| APPENDIX B: FINAL WORK PLAN FOR APRIL-MAY LAC CONSULTATION | 16 |
| APPENDIX C: LAC WORKSHOP SCHEDULE AND PARTICIPANTS, APRIL 16-18, 2012 | 18 |
| APPENDIX D: LAC WORKSHOP HANDOUTS, APRIL 16-18, 2012 | 21 |
| APPENDIX E: LAC WORKSHOP OUTCOMES, APRIL 16-18, 2012 | 45 |
| APPENDIX F: RESULTS OF LAC FOR NNP WORKING SESSION, APRIL 19, 2012 | 53 |
| APPENIX G: CONTACTS | 57 |

ABBREVIATIONS

| | |
|--------|--------------------------------------------------------------------------|
| COTR | Contracting Officer's Technical Representative |
| CPW | Chief Park Warden |
| DAI | Development Alternatives Inc. |
| LAC | Limits of Acceptable Change |
| NNP | Nyungwe National Park |
| PRMW | Planning, Research and Monitoring Warden |
| RDB | Rwanda Development Board |
| SOW | Statement of Work |
| SSENNP | Strengthening Sustainable Ecotourism in and around Nyungwe National Park |
| TMZ | Tourism Management Zone |
| TW | Tourism Warden |
| USAID | United States Agency for International Development |
| WCS | Wildlife Conservation Society |

EXECUTIVE SUMMARY

This report summarizes the activities, findings and recommendations of a three week assignment in Rwanda conducted by Lane Krahll from April 10 through May 2, 2012. The assignment focused on developing indicators for the Nyungwe National Park (NNP) Limits of Acceptable Change (LAC) framework.

During the assignment, Lane spent eleven days in NNP working with the Tourism Warden Planning, Research and Monitoring Warden, several NNP Guides, and a Biodiversity Specialist from the Wildlife Conservation Society (WCS), as well as some input from representatives from the Nyungwe Forest Lodge and the Nyungwe Top View Hill Hotel.

The assignment was initially designed to build upon work that the NNP was supposed to have done in accomplishing Steps 2 and 3 of the park's LAC framework:

- Step 2. Identify current and planned uses, concerns and issues
- Step 3. Define and describe Tourism Management Zones (TMZs)

Unfortunately, that work was not done. As a result, much of the first week of the consultancy was consumed by completing these two steps, so that work on Step 4, Select indicators of resource and social conditions, could be accomplished.

Although time was consumed accomplishing tasks outside of the original Scope of Work, the objectives of the assignment were achieved.

- Identify and assess potential indicators for use in the NNP LAC framework.
- Select appropriate indicators.
- Prepare materials required for collecting and compiling data on the indicators and for training those who will conduct the inventories.

FINDINGS

1. Step 2 of the NNP LAC Framework, the identification of issues and concerns, has been accomplished, via a participatory workshop with stakeholder participation.
2. Step 3 of the NNP LAC Framework, identification and description of Tourism Management Zones, was also accomplished in the same workshop. There are seven zones:
 - Nature Walk Zone
 - Bird Watching Zone
 - Primate Tracking Zone
 - Trekking Zone
 - Developed Zone
 - Engineered Attractions Zone
 - Motorized Sightseeing Zone

3. Indicators for the NNP LAC have been selected and associated protocols and forms have been documented in a Monitoring Manual. Although several of the indicators were field tested during the assignment, time was not available to field test all of them.
4. A training plan for implementing the NNP LAC Visitor Impact Monitoring Program has been developed. The plan addresses four types of training:
 - LAC Overview
 - Guide Report Form and Visitor Feedback Form
 - Field Procedures for Visitor Impact Monitoring
 - Data Entry Procedures for Visitor Impact Monitoring
5. Significant work remains before NNP will have a functioning LAC program. Before the baseline Visitor Impact Monitoring program can be implemented, the remaining protocols and forms need to be field tested and revised and the data base needs to be developed. After the inventory of baseline conditions is conducted, NNP needs to complete steps remainder of the planning steps in its LAC framework before it will have a functional LAC system.

RECOMMENDATIONS

1. Field test and refine monitoring forms and protocols, in particular, those for:
 - User-Made Trails
 - Guide Report Form
 - Monthly Structure Condition Inspections
 - Visitor Feedback Form
2. WCS should work with NNP to develop the LAC Visitor Impact Monitoring data base, so that the data collected during the inventory can be stored and analyzed to determine if tourism management standards are being met.
3. NNP should complete steps 5-8 of the NNP LAC Framework:
 - Step 5. Inventory resource and social conditions (using indicators)
 - Step 6. Specify standards for resource and social indicators for each TMZ
 - Step 7. Allocate specific locations in the park to TMZs (done with 6)
 - Step 8. Identify management actions (done with 6)

1. INTRODUCTION

This report summarizes the activities, findings and recommendations of a three week assignment in Rwanda conducted by Lane Krahll from April 10 through May 2, 2012. The assignment was to assist Nyungwe National Park (NNP) in identifying indicators for use in the NNP Limits of Acceptable Change (LAC) framework. The framework, developed by Mr. Krahll and park personnel in late 2011, has the following 10 steps:

- Step 1. Identify who will be involved, when
- Step 2. Identify current and planned uses, concerns and issues
- Step 3. Define and describe Tourism Management Zones (TMZs)
- Step 4. Select indicators of resource and social conditions
- Step 5. Inventory resource and social conditions using indicators
- Step 6. Specify standards for resource and social indicators for each TMZ
- Step 7. Allocate specific locations in the park to TMZs
- Step 8. Identify management actions
- Step 9. Implement management actions
- Step 10. Monitor indicators, compare to standards and repeat steps 8-10 (annually)

The assignment was initially designed to build upon work that the NNP was supposed to have done in accomplishing Steps 2 and 3. Unfortunately, that work was not done; so much of the first week of the consultancy was consumed by completing these two steps. Accomplishing these two steps was necessary before work could begin on Step 4, Select indicators of resource and social conditions. Nonetheless, the objectives of the assignment were achieved.

1.1 OBJECTIVES, TASKS AND DELIVERABLES

A copy of the Statement of Work (SOW) for this assignment is included as Appendix A of this report. The objectives of the assignment were:

1. Identify and assess potential indicators for use in the NNP LAC framework.
2. Select appropriate indicators.
3. Prepare materials required for collecting and compiling data on the indicators and for training those who will conduct the inventories.

These objectives were to be accomplished through six tasks:

- Review the results from Steps 2 and 3, identify relevant broad categories of indicators, and establish criteria for indicator selection.
- Review routine data collection and identify potential indicators already collected (or that could be indicators with minor modifications).

- Review relevant literature and solicit input from NNP staff and appropriate technical partners/stakeholder to identify possible indicators.
- Facilitate a meeting of NNP staff and appropriate technical partners/stakeholders to select indicators for use in the NNP LAC framework.
- Prepare material for collecting indicators:
 - Monitoring manual (documenting data collection and processing protocols)
 - Field data forms
 - Staff training plan
- Work with NNP and Wildlife Conservation Society (WCS) personnel to identify the requirements for a computer data base for the implementation of the framework and data entry protocols.

The results of the work were to be six deliverables:

- A list of selected indicators with documentation of how and why they were selected (the list of indicators is in the Monitoring Manual and documentation of their selection is in Appendices C-F).
- NNP LAC Indicator Monitoring Manual (submitted as a separate, stand-alone document).
- Field data forms (included in the Monitoring Manual and also submitted directly to NNP and DAI as stand-alone electronic files, ready for reproduction).
- NNP LAC Indicator data collection training plan (Finding 2.4).
- A Power Point presentation summarizing the assignment findings, conclusions and recommendations (presented at the debriefing and submitted electronically to DAI).
- A consultancy report on the above tasks, summarizing findings, conclusions and recommendations for future activities related to this scope of work (this report).

1.2 WORK PLAN, ACTIVITIES AND CHALLENGES

The first 5 days of the assignment were spent developing and securing approval of a work plan for the assignment and preparing for a three-day workshop to be held the following week in Gisakura. To that end, the consultant went to Kitabi on April 11 to meet with park and WCS staff and discuss potential activities. The work plan was approved on April 13 (Appendix B). The work plan called for a three-day workshop in Gisakura to introduce LAC to participants and complete steps 2 and 3 of the framework that had been scheduled for completion before arrival of the consultant. The schedule and list of participants in the workshop is presented in Appendix C. The handouts used in the workshop are presented in Appendix D, and the outcomes of the workshop are presented in Appendix E.

The workshop was to be followed by eight days in the park working with park and WCS staff to identify indicators, write protocols, prepare field forms, test and finalize protocols and field forms, and prepare a training plan for implementing the LAC visitor impact monitoring program. The plan also called for a meeting with park and WCS personnel to discuss the data base needs of the monitoring program. It was critical that WCS participate in this portion of the consultation, as it is the institution that will take the lead on designing the data base and training NNP personnel in its operation.

The work plan was implemented as designed, with two exceptions.

- Originally there had been some concern that a workshop be held at the end of the consultation to present the LAC concept and its implementation to a broader group of stakeholders, and possibly even representatives from other national parks. However, we were able to secure participation of some of the key stakeholders (the hoteliers) in the 3-day workshop in Gisakura, so in consultation with NNP and DAI personnel it was determined that the half-day workshop at the end of the consultation was not necessary.
- During the last day of meetings in Gisakura (April 26) the needs of the data base were discussed, and a representative of WCS was in attendance; however, the representative was not familiar with computerized data base design or operation. No one from WCS with that experience was in attendance. So only an outline of data analysis needs is presented in this report. Hopefully it will be sufficient for WCS to proceed on development of the data base.

The major challenge with this assignment was not having the NNP LAC framework at the point that it was supposed to be for the assignment. The assignment was initially designed to build upon work that the NNP was supposed to have done in accomplishing Steps 2 and 3 of the park's LAC framework:

- Step 2. Identify current and planned uses, concerns and issues
- Step 3. Define and describe Tourism Management Zones (TMZs)

Unfortunately, that work had not been done. So the consultant had to add these activities to his work during the first week of the assignment. Fortunately, we were able to successfully complete steps 2 and 3, but this delayed beginning work on the selection of indicators, the primary purpose of the consultation. As a result, although all of the deliverables have been produced, some of the protocols and field forms in the Monitoring Manual have not been field tested and the meeting with WCS personnel familiar with data base design and operation did not occur.

2. FINDINGS

2.1 Step 2 of the NNP LAC Framework has been accomplished.

During the first two days of the workshop, the participants generated a prioritized list of issues and concerns about visitor impacts in NNP. That list is presented in Table 1 as well as in Appendix E. These issues and concerns were used at various points in the workshop and subsequent meetings to identify what should be monitored and to identify specific indicators.

Table 1: Prioritized list of issues and concerns about visitor impacts in NNP.

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category 1 Erosion Habitat Degradation Wildlife Behavior Change | Category 2 Litter Habitat Destruction Human-Wildlife Disease Transmission Falling Trees Lack of Information on What to Expect Large Groups Noise from Main Road |
| Category 3 Negative Change in Local Culture Steep Trails Landslides Undeveloped Campground | Category 4 Unclean Trails Availability of Primates Wide Trail to Canopy Walk |
| The initial list was generated in small group sessions and then consolidated into one list representing the views of all in attendance. A constrained voting procedure was used to establish priorities. Those issues and concerns in Category 1 received the most votes. Those in Category 4 received no votes. | |

2.2 Step 3 of the NNP LAC Framework has also been accomplished.

At an LAC workshop conducted in December 2011 the participants identified a proposed list of seven TMZs for the NNP LAC framework. The participants at the April 16-18 workshop reviewed this proposal and adopted it without change. The seven zones are:

- Nature Walk Zone*
- Bird Watching Zone*
- Primate Tracking Zone
- Trekking Zone*
- Developed Zone
- Engineered Attractions Zone*
- Motorized Sightseeing Zone*

The zones marked with an “*” are defined as corridors. The other two zones (Primate Tracking and Developed) are polygons.

The December workshop also produced draft descriptions for four of the four of the TMZs:

- Nature Walk Zone
- Bird Watching Zone
- Primate Tracking Zone
- Engineered Attractions Zone

The participants in the April 16-18 workshop reviewed and revised these descriptions. They also developed descriptions for the other three zones. The descriptions for all seven zones, as produced at the workshop, are presented in Appendix E.

2.3 Indicators for the NNP LAC have been selected and associated protocols and forms have been documented in a Monitoring Manual.

During the final day of the April 16-18 workshop, the participants did some preliminary work on identifying and prioritizing “what needs to be monitored?” They also proposed some initial indicators for some of the higher priority items identified during the “what needs to be monitored?” exercise. These outcomes are presented in Appendix E.

The following day, April 19, a smaller group of the participants (four NNP Guides and a biodiversity specialist from WCS) met with the consultant to review the results of the workshop and develop preliminary indicators that could be tested and refined in the field. The results of this meeting are presented in Appendix F. The consultant used the outcome from this meeting to develop monitoring protocols for field testing.

On April 23 through 26 a team composed of the Tourism Warden, the Planning, Research and Monitoring Warden, three park Guides, a WCS biodiversity specialist and the consultant field tested the protocols for Trail Condition and Campsite Condition and developed and refined procedures and forms for User-Made Trails inspections and the Guide Report Form. The group also discussed the how to monitor Visitor Satisfaction and Availability of Information.

Using the outcomes of the fieldwork and meetings, the consultant developed an NNP Visitor Impact Monitoring Manual which details the materials, forms and protocols for monitoring all of the NNP LAC Indicators. This Manual was produced as a stand-alone document.

2.4 A training plan for implementing the NNP LAC Visitor Impact Monitoring Program has been developed.

On April 26 one of the topics of discussion was training needs for implementation of the visitor impact monitoring program. From that discussion, the following training plan was developed.

There are four target groups that need training on LAC for it to be successful:

- Park Managers
- Park Guides
- A subset of Park Guides who will conduct field monitoring
- Data Entry Staff

These groups should receive one or more of four types of training:

- LAC Overview
- Guide Report Form and Visitor Feedback Form
- Field Procedures for Visitor Impact Monitoring
- Data Entry Procedures for Visitor Impact Monitoring

2.4.1 LAC OVERVIEW TRAINING

All of the groups should receive the LAC Overview training. This should be a half-day event during which the basic concept of Limits of Acceptable Change can be presented as well as how it is being applied in NNP. The material used in this training can be drawn from the presentations and hand outs used during Day 1 of the April 16-18 workshop (electronic copies of which have been given to DAI and NNP), but those presentations will have to expand over-time as NNP completes the subsequent steps in the development of the NNP LAC framework. For instance, now that steps 2-4 have been completed, the presentation will need to be expanded to include this material.

LAC Overview training needs to be done soon for Guides, the subset of Guides that will be doing the field work for the baseline LAC Visitor Impact Monitoring and the personnel who will do data entry. These groups need to receive this training before they are asked to collect or enter visitor impact data. LAC Overview for these groups could be combined with the other types of training.

Training for park managers could be postponed until after the baseline monitoring has been completed. It could then be done as part of Step 6 in the framework, Specify standards for resource and social indicators for each TMZ, which should be done with park managers in a workshop format. The presentation would then include the results of the inventory.

LAC Overview training will ultimately have to become a standard part of new employee training/orientation.

At this point in time, the Tourism Warden and the Planning, Research and Monitoring Warden have received significant training in LAC and have participated since the beginning in the development of the NNP LAC. They should be capable of preparing and presenting the LAC Overview training.

2.4.2 GUIDE REPORT FORM AND VISITOR FEEDBACK FORM

Guides need to be trained in how to complete the Guide Report Form and how to manage the Visitor Feedback Form. The “textbook” for this training is the Guide Report Form and Visitor Feedback Form chapters in the NNP Visitor Impact Monitoring Manual. The training should be one-half day in length and could be combined with the LAC Overview training, to make a one-day LAC training event.

A half-day follow-up training session should be organized two to three weeks after the initial training. In the interim, between the two events, the guides will gain some experience in using the forms and the instructors will be able to review the use of the forms. Then they can meet, review the use of the forms, and make any necessary adjustments.

The team that participated in the field work and meetings from April 23-26 should be capable of being the instructors for this training, particularly if Recommendation 3.1 is implemented.

2.4.3 FIELD PROCEDURES FOR VISITOR IMPACT MONITORING

The Tourism Warden is charged with determining how many Guides will be trained to do the collection of field data for the Tourism Impact Monitoring. The number of Guides who will conduct the monitoring should be small enough to ensure consistency in the data collection, but large enough to ensure that the monitoring can be completed in one month (September). Once that number is determined, and the individual participants are identified, they will need to receive a week-long training on how to collect and record the field data. The “textbook” for this training will be the following chapters in the NNP Visitor Impact Monitoring Manual:

- Trail Condition
- Campsite Condition
- User-Made Trails
- Monthly Structure Condition Inspections

This training should include classroom and field exercises. In addition to learning the procedures and protocols, the trainees will be learning how to use the equipment (e.g., handheld GPS units, measuring wheels) and how to properly fill out the forms. During this time they should also be calibrating their professional judgments, so that they are making similar decisions regarding such items as what constitutes visual erosion, exposed roots and other indicators that require some degree of professional judgment.

The team that participated in the field work and meetings from April 23-26 should be capable of being the instructors for this training, particularly if Recommendation 3.1 is implemented.

2.4.4 DATA ENTRY PROCEDURES FOR VISITOR IMPACT MONITORING

The data entry personnel will be a small subset of the Guides who do the field data collection. Training for the data entry personnel should be primarily on-the-job training provided by the WCS personnel who develop the data base, but it could involve some classroom training.

The training will need to involve follow-up quality assurance and control to ensure that data entry is done correctly.

2.5 Significant work remains before NNP will have a functioning LAC program.

Although significant progress has been made towards developing and implementing the NNP LAC framework, significant work remains to be done. Of immediate concern is completion of field testing some of the protocols and forms in the NNP Visitor Impact Monitoring Manual. Completion of the other steps in the framework is also necessary, and will take considerable time and effort. These concerns are elaborated in the following Recommendations.

3. RECOMMENDATIONS

3.1 FIELD TEST AND REFINE MONITORING FORMS AND PROTOCOLS

The Trail Condition and Campsite Condition field forms and protocols were field tested and refined during this consultation, but due to lack of time (created by having to spend time working on completion of Steps 2 and 3 so that work on indicators could proceed), not all of the forms and protocols were field tested and refined. These include:

- User-Made Trails
- Guide Report Form
- Monthly Structure Condition Inspections
- Visitor Feedback Form

These protocols and forms should be field tested and revised before the baseline LAC Visitor Impact Monitoring is undertaken. The field testing and revisions should be undertaken by the team that participated in the field work and meetings from April 23-26, as they are most familiar with the NNP LAC framework and the indicator monitoring needs.

3.2 DEVELOP THE NNP LAC VISITOR IMPACT MONITORING DATA BASE

WCS needs to work with the NNP Tourism Warden and the Planning, Research and Monitoring Warden to develop a data base that will be able to store and analyse the NNP LAC Visitor Impact Monitoring data. In the work plan for development of the NNP LAC Framework, WCS was identified as providing technical support to NNP in the development of a computerized data base and data entry protocols.

The data base should be able to:

- Store all of the information collected on the field forms in the NNP Visitor Impact Monitoring Manual.
- Use the GPS data collected during Trail Condition inspections along with the shape files of trails to generate trail maps showing the type, location and magnitude of problems.
- Produce summary reports by individual areas allocated to TMZs for the units of measurement in Table 2, as these will be the units in which standards will be expressed. These individual areas will be specific trails, roads, developed areas (right now the only such area is Uwinka) and primate tracking areas.

Table 2. Indicators and units of measurement

| General Indicator | Specific Indicator | Unit of Measurement |
|------------------------------------|-------------------------------------------|-------------------------------------------------------|
| Trail Condition | Width | # of Sites/km |
| | Water in Trail | |
| | Muddy Area | |
| | Visible Erosion | |
| | Landslide | # of Large Sites/km |
| | Vegetative Encroachment | # of Sites/km |
| | Exposed Roots | |
| | Structure in Need of Repair | |
| | Litter | # of Pieces/km |
| Campsite Condition | Structures | #/Campsite |
| | Structures in Need of Repair | # of Incidents/Campsite |
| | Unburied Human Waste | |
| | Litter | # of Pieces/Campsite |
| User-Made Trail Inventory | Number | # of trails/High Probability Site |
| | Condition Class (1-5) of Each | # of trails/Condition Class/ High Probability Site |
| Group Size | People | People/Group |
| Human Encounters | Other Groups | # Other Group/Activity |
| | Park Staff, Trail Workers, Researchers | #/Activity |
| Availability of Information | | |
| User Satisfaction | | |
| Primate Counts | Species | # of Species Observed/Activity |
| Endemic Bird Counts | Species | # of Species Observed/Activity |
| Encounters with Target Primates | Encounters | # of Encounters/Activity |
| | Individual Animals | # of Individuals/Encounter |
| | Habituation | Level of Habituation/Encounter |
| Litter, non-campsite | Litter | kg/Zoned Area/Inspection |
| Condition of Structures | Cleanliness | # of Incidents/Zoned Area |
| | Needs Repair | |

3.2 COMPLETE STEPS 5-8 OF THE NNP LAC FRAMEWORK

Development and implementation of an NNP LAC Framework has been included in the 3-year activities plan in the Park Management Plan under Objective 4. Management of NNP tourism products and services strengthened. The associated actions are as follows:

Action 4.4 Implement NNP tourism monitoring system

- 4.4.1. Develop Limit of Acceptable Change process as a tool to assess Visitor Impact Monitoring system
- 4.4.2. Carry out annual LAC assessment
- 4.4.3. Organise a meeting with stakeholders to share LAC process
- 4.4.4. Implement the recommendations from LAC process

The development of the program was scheduled for the first three quarters of 2012. To assist in its implementation, DAI and NNP developed a “Work Plan for Developing and Implementing LAC in NNP” included as Appendix H in the December 2011 report: “Applying a Limits of Acceptable Change Approach to Managing Tourist Impact in Nyungwe National Park.” That work plan contains the following activities for steps 5-8:

Step 5. Inventory resource and social conditions (using indicators)

- 5.1. Train staff
- 5.2. Conduct inventory
- 5.3. Enter results in data base

Step 6. Specify standards for resource and social indicators for each TMZ

- 6.1. Compile results of Inventory and prepare for Workshop
- 6.2. 2-day Workshop to specify standards, allocate TMZs and identify management actions for each TMZ
- 6.3. Finalize standards, locations of TMZs and management actions for each TMZ

Step 7. Allocate specific locations in the park to TMZs (done with 6)

Step 8. Identify management actions (done with 6)

The work plan does not call for DAI or WCS technical support for implementing these steps. So NNP will have to undertake these activities with only logistical support. NNP and WCS have staff capable of undertaking these activities, but they will have to be given adequate time and support to prepare for and deliver these activities. The other alternative is for DAI and/or WCS to provide technical support to these activities.

APPENDIX A: STATEMENT OF WORK

STATEMENT OF WORK

ENVIRONMENTAL IMPACT SPECIALIST

| | | | |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------|
| Consultant Name: (Last, First) | Krahl, Lane | Position Title: | Environmental Impact Specialist |
| Contract Name: | Strengthening Sustainable Ecotourism in and around Nyungwe National Park – Nyungwe Nziza (Beautiful Nyungwe) | | |
| Contract Number: | AID-696-C-10-00002 | | |
| Period of Performance: | o/a April 9 – May 3, 2012 | | |
| Activity: | Technical support for the identification and selection of indicators for the Nyungwe National Park LAC framework and development of indicator collection protocols and supporting materials. | | |
| Travel Days: | 2 | | |
| Work Days Overseas: | 18 | | |
| Remaining Work Days: (Research, Report Writing) | 1 | | |
| Total Level of Effort: | 21 | | |

BACKGROUND

Rwanda is an emerging tourist destination, and Nyungwe Nziza seeks to help the country reach its tourism potential. To do so, the project targets the spectacular and protected Nyungwe National Park (NNP), focusing on inclusive ecotourism development for the benefit of local communities surrounding the park, and leveraging private sector investment in the management, construction, and maintenance of new and existing park infrastructure.

The Nyungwe Nziza project is helping the Rwanda Development Board (RDB) transform NNP into a viable ecotourism destination, capable of generating employment and sustainable and equitable income for local communities and other stakeholders, thus providing economic incentives to conserve the rich biodiversity of the Park. The ultimate goal is a thriving economy in NNP with engaged communities and a private sector that realize they can benefit economically by protecting and leveraging the unique environment in which they live and work.

In late 2011, Nyungwe Nziza supported an assessment of the impacts of tourism on NNP. The assessment found that although current tourist use is not causing unacceptable impacts to the park resources, NNP management needed to adapt and implement a limits of acceptable change (LAC) framework to ensure that future use does not impact park resources. Specifically, the assessment recommended using an adaptation of the LAC framework used by the United States Forest Service, which would have 10 steps:

- Step 1. Identify who will be involved, when
- Step 2. Identify current and planned uses, concerns and issues
- Step 3. Define and describe Tourism Management Zones (TMZs)
- Step 4. Select indicators of resource and social conditions
- Step 5. Inventory resource and social conditions using indicators

- Step 6. Specify standards for resource and social indicators for each TMZ
- Step 7. Allocate specific locations in the park to TMZs
- Step 8. Identify management actions
- Step 9. Implement management actions
- Step 10. Monitor indicators, compare to standards and repeat steps 8-10 (annually)

Subsequent to the assessment, development and implementation of an LAC framework for NNP was adopted as an Action to in the NNP Management Plan. The development of the LAC framework is scheduled to begin in the first quarter of 2012.

NNP staff, with logistical support from Nyungwe Nziza, is undertaking the first three steps of the LAC without technical support. However, they will require technical support to undertake Step 4, Select indicators of resource and social conditions, including preparing field procedures and training material.

OBJECTIVES

In the above context, Nyungwe Nziza is seeking the services of an environmental impact specialist who will work in collaboration with the Rwanda Development Board and the Wildlife Conservation to Society (WCS) to:

1. Identify and assess potential indicators for use in the NNP LAC framework.
2. Select appropriate indicators.
3. Prepare materials required for collecting and compiling data on the indicators and for training those who will conduct the inventories.

TASKS (PERFORMANCE REQUIREMENTS)

Under the technical oversight of Nyungwe Nziza's Chief of Party, and in close coordination with the Rwanda Development Board's (RDB) Product Development and Planning Division, the consultant will undertake the following tasks:

- Review the results from Steps 2 and 3, identify relevant broad categories of indicators, and establish criteria for indicator selection.
- Review routine data collection and identify potential indicators already collected (or that could be indicators with minor modifications).
- Review relevant literature and solicit input from NNP staff and appropriate technical partners/stakeholder to identify possible indicators.
- Facilitate a meeting of NNP staff and appropriate technical partners/stakeholders to select indicators for use in the NNP LAC framework.
- Prepare material for collecting indicators:
 - Monitoring manual (documenting data collection and processing protocols)
 - Field data forms
 - Staff training plan
- Work with NNP and WCS personnel to identify the requirements for a computer data base for the implementation of the framework and data entry protocols.

DELIVERABLES

- A list of selected indicators with documentation of how and why they were selected.
- NNP LAC Indicator Monitoring Manual.
- Field data forms.
- NNP LAC Indicator data collection training plan.
- A Power Point presentation summarizing the assignment findings, conclusions and recommendations.
- A consultancy report and on the above tasks, summarizing findings, conclusions and recommendations for future activities related to this scope of work.

APPENDIX B: FINAL WORK PLAN FOR APRIL-MAY LAC CONSULTATION

Tuesday, April 10

- Arrive, 11:00am
- Meetings with DAI

Wednesday, April 11

- Meeting with NNP and WCS personnel at NNP Headquarters, Kitabi to develop a draft work plan for the consultation

Thursday-Friday, April 12-13

- Prepare work plan for consultation
- Prepare for fieldwork and workshop

Saturday, April 14

- Prepare for fieldwork and workshop

Monday-Tuesday, April 16-17

- Travel to Gisakura
- Meet with NNP and WCS Core Team (Ildephonse Kambogo, Innocent Ndikubwimana and some guides from NNP, and Felix Mulindahabi and Jean Baptiste from WCS) to finalize Steps 2 and 3 of the NNP LAC process
 - Identify Issues and Concerns in NNP about tourism impact
 - Define Tourism Management Zones

Wednesday-Friday, April 18-20

- Work with the Core Team to complete steps 4.1 through 4.5
 - 4.1 Review results from Steps 2 and 3, identify relevant broad categories of indicators, and establish criteria for indicator selection
 - 4.2 Review routine data collection and identify potential indicators already collected (or that could be indicators with minor modifications)
 - 4.3 Literature review of other possible indicators
 - 4.4 Brainstorm of other possible indicators
 - 4.5 Select Indicators
- Identify preliminary protocols

Saturday, April 21

- Prepare 1st Draft of protocols and data forms
- Prepare for field tests

Monday, April 23

- Field test protocols with Core Team
- Debrief field tests

Tuesday, April 24

- Meet with the Core Team to revise protocols and field data forms

- Prepare 2nd Draft of protocols and field data forms

Wednesday, April 25

- Field test revised protocols and data forms with the Core Team
- Debrief field tests

Thursday-Friday, April 26-27

- Work with the Core Team to:
 - finalize protocols and data forms,
 - identify the requirements for a computer data base, and
 - develop staff training plan
- Prepare NNP LAC Indicator Monitoring Manual
- Travel to Kigali (Friday afternoon)

Saturday, April 28

- Prepare NNP LAC Indicator Monitoring Manual, including Data Forms
- Prepare NNP LAC Staff Training Plan

Monday-Tuesday, April 30-May1

- Prepare Consultancy Report
- Prepare Debrief PowerPoint

Wednesday, May 2

- Half-day workshop on LAC and its application in NNP, in Kigali.
 - Participants to be determined
- Present Debrief for USAID, RDB, DAI and WCS
- Depart, 9:00pm

APPENDIX C: LAC WORKSHOP SCHEDULE AND PARTICIPANTS, APRIL 16-18, 2012

Monday, April 16

Objectives: Understand LAC and its use in Nyungwe National Park (NNP).
Identify issues and concerns about tourism impacts on NNP.

- 2:00 – 3:30 Introduction to LAC and its use in NNP
- 3:30 – 3:45 Break
- 3:45 – 4:30 Small group work on Issues and Concerns in NNP about tourism impact
- Tourist group – working with Tourist Comments
 - Resource manager group
- Each group:
1. Identifies a facilitator and a recorder
 - a. Facilitator facilitates the group's discussion
 - b. Reporter captures the ideas and prepares presentation
 2. Brainstorms a list of issues and concerns about tourism impact on park resources and the tourist experience
 3. Review your list and make sure that they are directly linked to visitor use
 4. Prioritizes the list
- 4:30 – 5:00 Plenary Session
- Small group presentations

Tuesday, April 17

Objectives: Finalize work on Issues and Concerns
Identify Tourism Management Zones (TMZs) for NNP
Write descriptions for each TMZ

- 8:00 – 8:30 Consolidate results of the two groups into one NNP list of concerns and issues
- 8:30 – 9:00 Review previous work on Tourism Management Zones
- 9:00 – 10:00 Review and revise (if necessary) the 7 proposed TMZs
- 10:00 – 10:15 Break
- 10:15 – 12:15 Review and revise the descriptions of the 4 TMZs that have proposed descriptions
- 12:15 – 12:30 Introduction for Descriptions of other 3 TMZs and small group assignments
- 12:30 – 1:30 Lunch
- 1:30 – 3:00 Small Group work on Descriptions

3:00 – 3:15 Break

3:15 – 5:00 Plenary Session

- Small group presentations
- Consolidate the results of the two groups into one description for each of the three TMZs

Wednesday, April 18

Objectives: Finalize descriptions of TMZs

Introduce Indicators

Identify preliminary indicators for use in NNP

8:00 – 9:00 Finalize descriptions of TMZs

9:00 – 10:00 Small Group Activity – What should we monitor?

Each group:

1. Identifies a facilitator and a recorder
2. Compiles each members homework into one “what should be monitored” form.
3. Adds to the list as necessary
4. Circle no more than the 5 most important “things to monitor” for each TMZ

10:00 – 10:15 Break

10:15 – 11:30 Plenary Session

- Small group presentations
- Consolidate the results of the groups into one NNP list of “things to monitor”
- Agree on the 5 priorities for each TMZ

11:30 – 12:00 What is already monitored? Do any of them meet the LAC needs?

12:00 – 12:30 Introduction to Indicators

12:30 – 1:30 Lunch

1:30 – 2:30 Results of Literature Review

2:30 – 3:30 Small group work on identifying indicators

Each group:

1. Identifies a facilitator and a recorder
 - a. Facilitator facilitates the group’s discussion
 - b. Reporter captures the ideas and prepares presentation
2. Receives a list of priority “things to monitor” that the group will work on
3. Compare your list with the list of indicators from the Literature Review

4. Brainstorm other indicators that should be added to those found in the Literature Review
5. Identify the indicators you think NNP should use for your list of “things to monitor”

3:30 – 4:30 Plenary Session

- Small group presentations

4:30 – 5:00 Next Steps

Participants

| <u>Name</u> | <u>Organization</u> |
|-------------------------|-----------------------------|
| Dushimimana Jules Cesar | NNP |
| Eppa David | Nyungwe Forest Lodge |
| Faustine Mugabe | Nyungwe Top View Hill Hotel |
| Gakima Jean Baptiste | WCS |
| Imanishimwe Ange | NNP |
| Kambogo Ildéphonse | NNP |
| Karerwa Goreth | Nyungwe Top View Hill Hotel |
| Mugabe Robert | NNP |
| Ndikubwimana Innocent | NNP |
| Ntoyinkima Claver | NNP |
| Samson Kibet | Nyungwe Top View Hill Hotel |

APPENDIX D: LAC WORKSHOP HANDOUTS, APRIL 16-18, 2012

LAC in NNP Workshop, December 2011 Outcomes

During workshop practical exercises were undertaken by the participants to write a park purpose statement, describe the significant park characteristics and current park tourism activities, and define and describe potential tourism management zones. The results of those activities are presented below.

Park Purpose

The purpose of Nyungwe National Park is to protect biodiversity within the boundaries of the park; maintain the ecological services the area provides to local communities, the country and the global community; and to contribute to the economic development of Rwanda through providing sustainable tourism activities.

Significant Park Characteristics¹

Nyungwe National Park (NNP) is located in southwest Rwanda along the Congo-Nile divide, at the source of the White Nile. NNP covers a total area of 1,019 km² and ranges in elevation from 1,600 to 2,950 meters above sea level. NNP lies in the Albertine Rift and is contiguous with the Kibira National Park in Burundi. The two parks together compose the largest block of intact montane forest in Africa. It provides vital watershed protection for Rwanda and neighboring countries.

NNP is among the most diverse and important montane forests in East Africa. It supports an abundance of animal and plant life, including many rare and endemic species. Fourteen species of primates are found in the park, including the endangered Chimpanzee (*Pan troglodytes*), the vulnerable Owl-faced monkey (*Cercopithecus hamlyni*), L'hoests monkey (*Cercopithecus lhoesti*), and large troops of Black and white colobus (*Cercopithecus angolensis*). The park also supports a variety of other mammal species such as the Black-fronted duiker (*Cephalophus nigrifrons*), Bushpigs (*Potamochoerus porcus*), Serval cat (*Leptailurus serval*), and numerous species of rodents and bats, including the Ruwenzori sun squirrel (*Heliosciurus ruwenzorii*), an Albertine Rift endemic.

¹ Sources:

Fischer, Eberhard and Dorothee Killmann. 2008. Illustrated Field Guide to the Plants of Nyungwe National Park, Rwanda. Koblenz Geographical Colloquia, Series Biogeographical Monographs 1, Institute for Integrated Natural Sciences, University of Koblenz-Landau, Koblenz, Germany. 771 pp.

Nyungwe Forest Conservation Project. n.d. Nyungwe National Park Guide. 57 pp.

Rwanda Development Board (RDB). 2011. Draft Nyungwe National Park Management Plan 2012-2021. Tourism & Conservation Department, RDB, Kigali, Rwanda. 98 pp.

NNP also has at least 285 species of birds, of which 26 are endemic to the Albertine Rift. Three bird species are listed as threatened by IUCN: Kungwe apalis (*Apalis argentea*), Grauer's swamp warbler (*Bradypterus graueri*) and Shelley's crimson wing (*Cryptospiza shelleyi*). Other animal species found in the park include 43 species of reptiles (including 10 Albertine rift endemics), 31 species of amphibians (15 endemics) and 120 identified species of butterflies, including 21 Albertine Rift endemics.

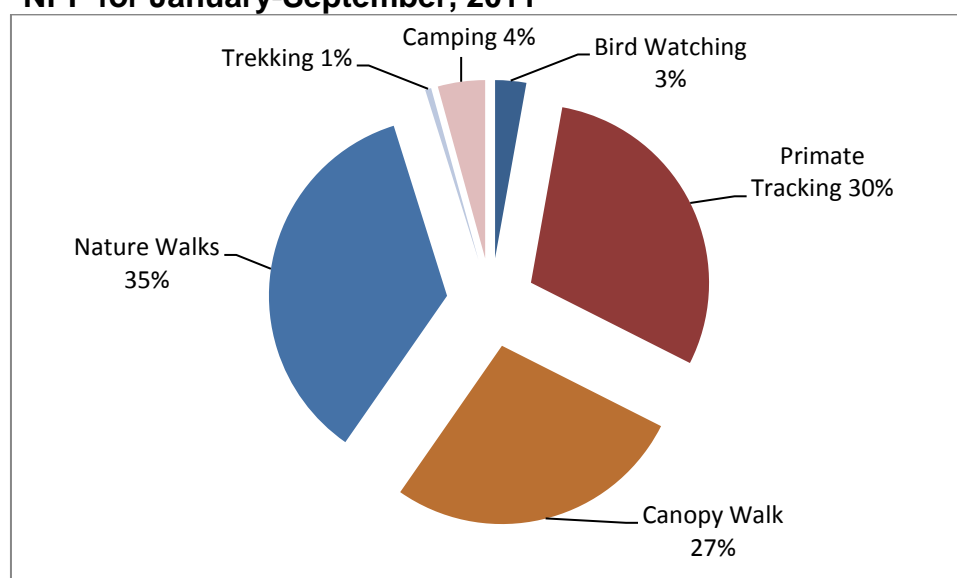
The flora and vegetation of NNP are unique, including at least 47 local endemic species of flowering plants, about 280 Albertine Rift endemics and 148 species of identified orchids. In addition to lower, middle and upper montane forests, the park encompasses bamboo forests, grasslands, and several swamps and moorlands, including the Kamiranzovu swamp, the largest peat bog in tropical Africa.

Current Park Tourism Activities²

Park visitation has grown significantly in the past 10 years. In 2002 the park (then a Forest Reserve) received less than 1,000 visitors. In 2010 NNP received 4,000 visitors, and at current use levels, it will receive slightly more than 7,000 in 2011. Only 16 percent of the visitors are Rwandan and 19 percent are foreigners resident in Rwanda. The remaining 65 percent of visitors come to the park as tourists from foreign countries, with 38 percent coming from Europe, 15 percent from North America, 7 percent from Africa and 5 percent from other parts of the globe (Asia, Australia and South America).

On average, each visitor participates in 1.34 activities during his or her visit, indicating that at least 66 percent of the visitors come to the park and participate in only one activity. Most visitors stay in the park vicinity for only one night. The major attractions in the park are nature walks, primate tracking and the canopy walk (see Figure 1).

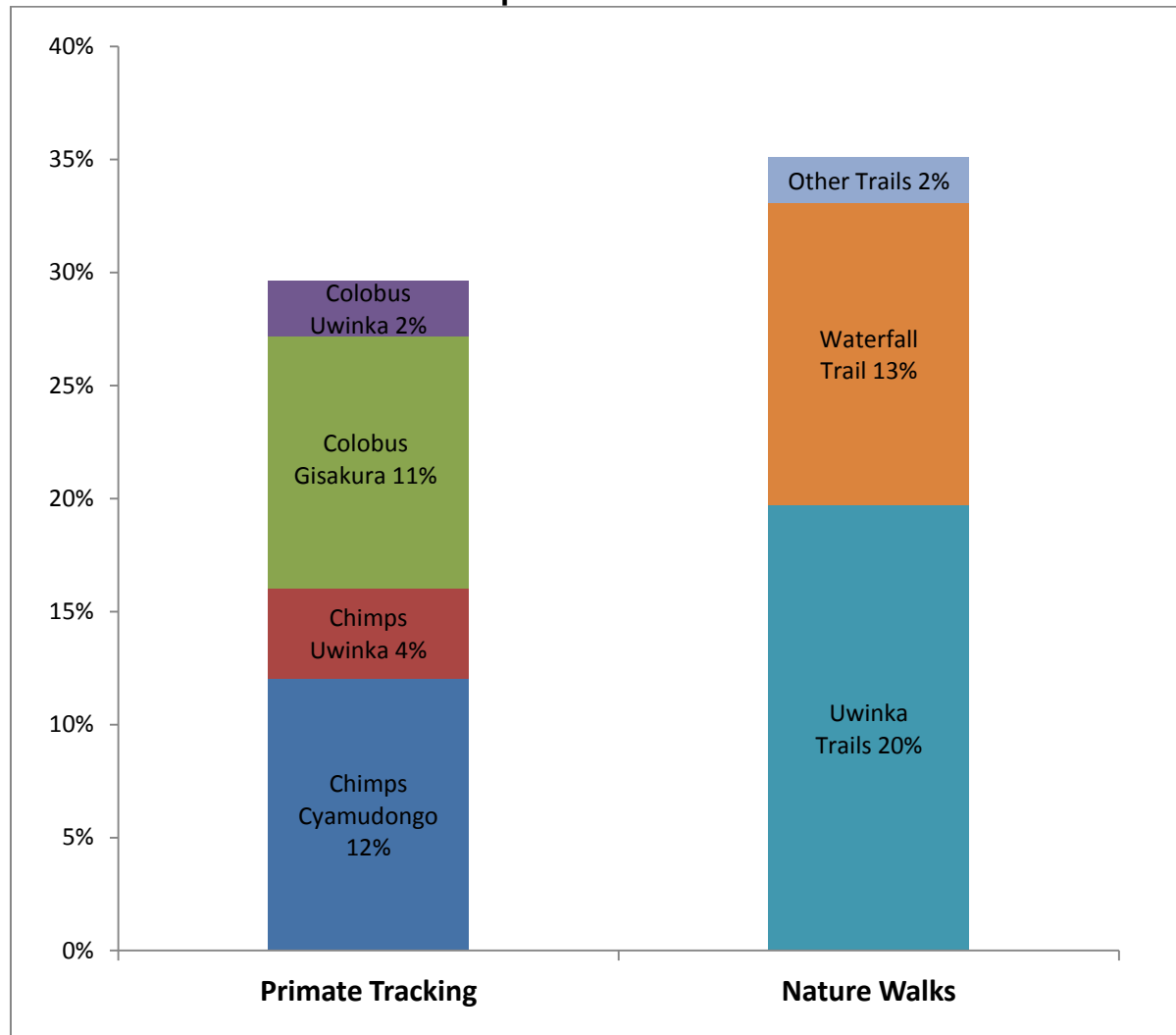
Figure 1: Proportions of visitors undertaking different NNP visitor activities in NNP for January-September, 2011



² Based primarily upon NNP Tourism statistics from January through September, 2011.

The most popular nature walk in the park is the Waterfall Trail out of Gisakura, however, the combined trails out of Uwinka receive more use (Figure 2). The most popular area for Chimpanzee tracking is Cyamudongo, and for Colobus tracking the most popular area is Gisakura (Figure 2).

Figure 2: Proportions of visitors undertaking different primate tracking and nature walks for Jan-Sep 2011



Proposed Tourism Management Zones for NNP

The workshop participants proposed the following seven TMZs for NNP:

- Nature Walk Zone*
- Bird Watching Zone*
- Primate Tracking Zone
- Trekking Zone*
- Developed Zone
- Engineered Attractions Zone*
- Motorized Sightseeing Zone*

The zones marked with an “*” are defined as corridors. The other two zones (Primate Tracking and Developed) are polygons.

Proposed descriptions were developed for four of the zones (Table 1). Items in *italics* in the descriptions are components of the descriptions upon which the group did not reach consensus. Underlined items are additions suggested by the consultant as he transcribed the descriptions from the workshop flipcharts to this report.

Table 1: Tourism Management Zone descriptions

| Category | Nature Walk Zone | Bird Watching Zone |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Description | This zone is comprised of trail corridors used primarily for guided nature walks. No off-trail visitor use is allowed in this zone. | This zone is comprised of trail corridors used primarily for guided bird watching. Minimal off-trail visitor use to improve bird viewing is allowed in this zone. (This zone is restricted to bird watching in the mornings and evenings, but may be used for nature walks from mid-morning to mid-afternoon. During non-bird-watching uses, no off-trail use is allowed and the visitor experience is managed to meet the Nature Walk Zone conditions.) |
| Biophysical Resource Conditions | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. <i>Minor modifications of resources outside of the immediate trail corridor can be made for essential visitor and park operation needs, but they are changed in a way that harmonizes with the natural environment.</i> | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. Minor modifications of resources outside of the immediate trail corridor can be made to improve bird viewing and for park operation needs, but they are changed in a way that harmonizes with the natural environment. |
| Visitor Experience/ User Contact | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is moderate. | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is low. |
| Management Conditions | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. <u>Trail guide pamphlets</u> , guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges, boardwalks, bird towers and benches) are the only facilities in this zone. <u>Trail guide pamphlets</u> , guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. |

| Category | Nature Walk Zone | Bird Watching Zone |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category | Engineered Attractions Zone | Primate Tracking Zone |
| General Description | This zone is comprised of trail corridors used for access to engineered attractions (e.g., canopy walks and zip lines) and the corridors through which engineered structures pass. Guides are required in this zone. No off-trail or off-route visitor use is allowed in this zone. (During dawn and dusk, some of the structures in this zone may be used for bird watching, at which time the visitor experience is managed to meet the Bird Watching Zone conditions.) | This zone is comprised of the areas (polygons) used for guided primate habituation, tracking and viewing. Significant off-trail visitor use to improve primate viewing is allowed in this zone. |
| Biophysical Resource Conditions | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. Significant, localized resource modifications associated with engineered structures may be evident in the immediate corridor. There is minimal visible impact on resources outside of the immediate corridor. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridors. There is <u>moderate</u> visible impact on resources from visitor use and tracking camps outside of the immediate corridor. |
| Visitor Experience/ User Contact | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they experience this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is high. | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. Visitors will not encounter other visitors (outside of those in their own group) in this zone. |
| Management Conditions | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) and the engineered structures themselves are the only facilities in this zone. Guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. Information pamphlets and signage as well as guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. |

A BRIEF DESCRIPTION OF THE LIMITS OF ACCEPTABLE CHANGE FRAMEWORK³

Limits of Acceptable Change (LAC) was developed in response to several years of attempts to apply carrying capacity to visitor use of natural areas (natural area tourism). The concept of carrying capacity is based on the hypothesis that a given natural area can only accommodate a certain number of visitors before the resource will be degraded. This hypothesis had been successfully applied to wildlife and range management for years, so it seemed reasonable that it could be applied to natural area tourism. Through the 1960s and 1970s researchers and natural area managers in the United States struggled to identify carrying capacity for natural areas. The attempts were unsuccessful, primarily for two reasons:

- Visitors are not homogeneous. They come to a natural area to do different activities and they behave in different ways. For example, one irresponsible camper (who leaves garbage everywhere, makes a lot of noise, constantly gets off designated trails, builds huge fires, hacks at trees with his knife and axe, etc.) can have significantly more impact than 10 “leave no trace” hikers (who stay on trails, travel silently, pack out garbage and maybe even human wastes, cook on gas stoves, etc.)
- Carrying capacity has a social as well as a biophysical component. Visitors have an expectation of what their natural experience will be, so even though an area may be able to sustain 20 people a day passing through it without any biophysical damage, an individual visitor may not want to see 19 other people in the course of the day. He or she came to the park to be with nature not people.

These conclusions shifted the discussion about natural area tourism from “how many?” to “what conditions?” LAC was developed to address this shift. It attempts to define what conditions are acceptable from both the natural resource perspective and the visitor experience perspective and then manage for those conditions. It assumes there will be some impact. “The challenge is not one of how to prevent any human-induced change, but rather one of deciding how much change will be allowed to occur, where, and the actions needed to control it.”⁴

LAC was first developed by the United States Forest Service in 1985 and it has been successfully applied on many National Forests in the United States. A form of LAC was developed by the United States Park Service in the mid-1990s called Visitor Experience and Resource Protection (VERP). Both Canada and New Zealand use LAC approaches in management of their protected areas.

LAC was developed to help managers provide recreational opportunities while protecting natural resources. Protected areas are impacted by uses other than recreation, but LAC deals only with recreational impacts. It is based on a management-by-objectives approach and assumes an iterative plan-do-check-adjust management style. It has four major components:

1. Specification of acceptable and achievable resource and social conditions, defined by measurable parameters.
2. Analysis of the relationship between existing conditions and those judged acceptable.
3. Identification of management actions necessary to achieve the acceptable conditions.
4. Implementation of a program of monitoring and evaluation of management effectiveness.

³ This paper was produced by Lane Krahll for use in a workshop on Limits of Acceptable Change held at Gisakura, Rwanda on April 16-18. It is based on a similar paper produced for and LAC workshop on December 12-16, 2011. The workshop is a component of the Nyungwe Nziza Project, implemented by DAI, a USAID contractor. It draws primarily from: Stankey et al. 1985, the seminal document on LAC.

⁴ Stankey et al. 1985, page 1.

LAC is implemented in nine interrelated steps.

1. Identify concerns and issues
2. Define and describe recreational opportunity classes
3. Select indicators of resource and social conditions
4. Inventory resource and social conditions
5. Specify standards for resource and social indicators
6. Identify alternative opportunity class allocations
7. Identify management actions for each alternative
8. Evaluate and select an alternative
9. Implement management actions and monitor conditions

Because this approach was developed by the United States Forest Service, steps 6 through 8 reflect public decision-making requirements for the management of National Forests, where alternatives are always developed and presented to the public as well as the managers before making a decision.

A more generic process would have 8 steps, collapsing steps 6, 7 and 8 into two steps:

6. Allocate specific locations in the park to opportunity classes
7. Identify management actions

Step 9 would then become Step 8. Each of these eight steps is elaborated in the following sections.

Step 1: Identify Concerns and Issues

“PURPOSE

- To identify features or values of particular concern to be maintained or achieved
- To identify specific locations of concern
- To provide a basis for the establishment of management objectives
- To guide the allocation of land to different opportunity classes

PROCESS

- Identify issues raised during public involvement
- Identify concerns raised by resource managers, planners, and policymakers
- Review agency policy
- Analyze regional supply and demand
- Analyze opportunities in the area from a regional and national perspective

PRODUCT

- Narrative write up identifying unique values and special opportunities to be featured in area's management and problems requiring special attention”⁵

In practice, this step also includes a brief description of current visitor use and current tourism management including:

- Types and seasons of use.
- Use and user characteristics:
 - Where do users come from? Why do they come? What do they do? Where do they stay? For how long?
 - What type of experience do users want?
 - Why are some areas used more than others?
 - What facilities are in the park (camps, trails, visitor center, etc.)?
 - Are there concessions? What are they? What condition are they in?
- Current management activities.

⁵ Stankey et al. 1985, page 5.

In the late 1990s some U.S. Forest Service researchers recommended an additional step preceding this step to develop an explicit statement of the area goals and values. Many of the other LAC approaches include a development of a purpose statement for the protected area as well as issues and concerns to help guide the LAC process.

Step 2: Define and Describe Opportunity Classes

PURPOSE

- To identify and classify the types of zones (opportunity classes) that will be managed for tourism
- To describe the general acceptable conditions for each type of zone including resource condition, visitor experience and management conditions

PROCESS

- Review information collected during Step 1
- Identify, name and describe the types of opportunity classes that will respond to the purpose of the park and issues and concerns about tourism in the park

PRODUCT

- Narrative descriptions of resource condition, visitor experience and managerial conditions defined as appropriate and acceptable for each opportunity class

In this step, managers must select and name a set of opportunity classes (tourism zones) that reflect the range of experiences they wish to provide in the park. Classes should be developed for both ends of the range and as many classes in between as are necessary (but not too many). The descriptions should follow a logical progression from the most pristine opportunity classes to the least pristine. In subsequent steps, all of the land in the park that is open to visitors will be assigned to one of these opportunity classes.

Each opportunity class description has three parts:

- The type, severity, prevalence/extent, and apparentness (to other users) of impacts on biophysical resources.
- Visitor experience, measured as extent and location of user contact (“interparty contact”).
- Management conditions including presence of management personnel, onsite versus offsite management strategies, site modifications and rules and regulations on behavior.

| Examples of Opportunity Class Descriptions (from Stankey et al. 1985) | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category | Primitive (most pristine class) | Transition (least pristine class) |
| Biophysical Resource Conditions | Resource impacts are minimal; restricted to minor temporary loss of vegetation where camping occurs and along some travel routes. Impacts typically recover on an annual basis and are subtle in nature, generally not apparent to most visitors. | Resource impacts found in many locations and some can be substantial in a few places such as near major entry points. Impacts often persist from year to year. May be substantial loss of vegetation and soil at some sites. Impacts are readily apparent to most visitors. |
| Visitor Experience/ User Contact | Few, if any, contacts with other groups. Contact limited to trails; camping out of sight and sound of others almost always possible. | Contact with others moderately frequent. Fairly high level of interparty contact can occur, both while on the trail and while camped. |
| Management Conditions | Direct onsite management of visitors not practiced. Little or no evidence of site management. Necessary rules and regulations communicated to visitors outside the area. <i>Little evidence of management personnel.*</i> | Extensive use of onsite management and site modification. Rules and regulations enforced with signs and <i>management personnel in the area.*</i> Substantial use of regulations to influence visitor behavior. |
| *In the U.S. “guide only” tours are generally restricted to high value cultural resources. Pristine high value natural resources are generally experienced by tourists without guides. In Rwanda, where guides are required in high value areas, “Pristine” areas may have the highest level of park staff/tourist interactions. | | |

Collectively, the narrative descriptions of the resource conditions, visitor experience and managerial conditions for each opportunity class constitute the management objectives for the class. 9)

Step 3: Select Indicators of Resource and Social Conditions

PURPOSE

- To identify specific, measureable parameters (indicators) to guide the inventory (Step 4) and monitoring (Step 9)
- To provide a basis for identifying where and what management actions are needed

PROCESS

- Review opportunity class descriptions (step 2) and issues and concerns (Step 1)
- Identify relevant broad categories of indicators
- For each broad category, identify one or more specific, measurable indicator

PRODUCT

- List of measurable resource and social indicators (preferably quantifiable)

In this step the park managers identify what will be measured to determine if the conditions within the opportunity classes are being met. Working from general categories down to specific indicators the result is a set of specific, measureable indicator. Specific, measurable indicators are those that:

- Can be measured in cost-effective ways at acceptable levels of accuracy.
- Reflect some relationship to the amount and/or type of use occurring.
- Are related to user concerns (for social indicators).
- Will be at least potentially responsive to management control.

For each indicator the managers should specifically identify the parameter to be measured, the unit of measurement and the protocol for measurement.

| General Categories and Specific Indicators Considered for the Imagination Peaks Wilderness | | |
|---------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | General Category | Specific Indicator |
| Social | Solitude While Traveling | Number of other parties met per day while traveling |
| | Campsite Solitude | Number of other parties camped within sight or sound per day |
| Resources | Trail Conditions | Percent of trail system kilometers with multiple trails |
| | | Percent of trail system kilometers with severe erosion (entrenchment of over 1.3 m ² cross-section) and/or very muddy, boggy areas 3 meters or longer |
| | Campsite Conditions | Number of campsites per 200-ha area (a circle 1.6 km in diameter) |
| | | Square meters of devegetated area within any 2-ha circle |
| | | Condition class rating (a composite rating based on the severity of a number of impacts on the campsite, with class 1 very minimally impacted and class 5 severely impacted [Cole 1983; Frissell 1978]) |
| | Range Conditions* | Degree of forage utilization |
| | Threatened and Endangered Species | Population trend for threatened and endangered species (associated with probable human causes) |
| Adapted from Stankey et al. 1985, page 24 | | |
| *Considered because pack animals are used in the Wilderness Area. | | |

Step 4: Inventory Resource and Social Conditions

PURPOSE

- To determine current conditions in the areas of the park open to tourists
- To gain knowledge that will assist managers in establishing meaningful standards and allocating specific geographical areas to different opportunity classes
- To identify where management actions may be needed

PROCESS

- Collect and map data on indicators chosen in Step 3

PRODUCT

- Tabulations and analysis of data as well as maps

Managers can work with existing data, if it provides sufficient information, but if not, they will need to conduct additional data collection. Mapping the data will be useful in allocating areas (Step 6) and identifying where management actions are necessary (Step 7).

Step 5: Specify Standards for Resource and Social Indicators

PURPOSE

- To provide a means whereby it is possible to evaluate where and what management actions are needed by permitting comparison of existing conditions with those defined as acceptable for each indicator in each opportunity class (for the planning stage as well as subsequent monitoring)

PROCESS

- Review opportunity class descriptions developed in Step 2
- Analyze inventory data collected in Step 4 for each indicator

PRODUCT

- A table of specific, quantifiable measures of acceptable conditions for each indicator in each opportunity class

This step is done after the inventory to bring in a level of reality into the standard setting process. This step is highly judgmental, producing “best estimates” based on managerial experience, professional judgment, and public input; therefore it is critical that the reasoning for establishing each standard be documented in writing. As more experience is gained via implementation and monitoring, standards can be changed, so the managers should not be hesitant to make their “best estimates” at this point.

The standards should not be idealistic goals, but conditions that can be achieved over a reasonable time. They “should be stringent enough to be meaningful, but not so stringent they cannot be attained.”⁶ In some cases, they may just be statements describing current conditions (if those conditions are what is desirable, and if something less than the current conditions would be judged to be unacceptable). The standards may also be “higher” than current conditions, if the conditions are degraded in a particular area within an opportunity class and opportunities associated with that class.

There are three general guidelines to establishing standards:

1. Standards Follow Descriptions of Opportunity Classes
 - Standards quantify the qualitative statements developed in Step 2.
 - Use the inventory results to be realistic (what is happening?) but don’t just default to the existing conditions, if they are not acceptable (with “acceptable” being defined using the information collected in Step 1).
2. Standards Describe a Range of Conditions
 - Moving across the opportunity classes, standards describe a logical progression in differing acceptable conditions. If the Step 2 description of an opportunity class is “very high chances of solitude” then the standard for an indicator of “camped within sight or sound of another party” may be “no other campsites within sight or sound of each other.” Moving to the next opportunity class, with a less stringent descriptor of solitude, the standard may be “campsites located so that no more than one other party is within sight or sound”, with the next class being “no more than 2” and the next, “no more than 4.”
 - On occasion more than one opportunity class may have the same standard.
 - In rare cases there may be a standard shared by all classes (e.g., water quality standard)

⁶ Stankey et al. 1985, page 12.

3. Standards Express the Typical Situation

- May be best to express as a probability (so as not to rule out the rare occurrence). For instance, “Interparty contact levels on the trail will not exceed two per day on at least 90 percent of the days during the summer use period.”

Step 6: Allocate Specific Locations in the Park to Opportunity Classes

PURPOSE

- To define what resource and social conditions will be provided in different geographical areas of the park

PROCESS

- Review information obtained from Steps 1, 2, 4 and 5 and bring that information together to identify alternative allocations of geographic areas to opportunity classes specific area
- Working in conjunction with Step 7, select an appropriate allocation

PRODUCT

- Maps and tabular summaries of alternative opportunity class allocations

This step is conducted as an iterative process with Step 7, as the allocation of areas to opportunity classes largely defines management needs and the evaluation of management actions to meet those needs may influence the allocation of classes. The assigned geographic areas may be existing management units or other areas reasonably identifiable by topographic features or specific uses. The boundaries should be geographic or human features that can be readily identified in the field (stream, ridge, road, etc.)

Step 7: Identify Management Actions

PURPOSE

- To identify management needs for the chosen allocation of opportunity classes

PROCESS

- Review the managerial condition portion of the opportunity class description defining the appropriate types of actions
- Analyze the differences between existing conditions (Step 4) and those defined as acceptable by the standards (Step 5)
- Analyze the costs and appropriateness of alternative management actions for bringing existing conditions in line with standards
- Select the most reasonable and feasible management actions

PRODUCT

- List or map of all places where existing conditions are worse than standards and identification of what management actions will be implemented to maintain or secure standards

As discussed above, this step is done iteratively with Step 6. If the allocation is to maintain current uses and the resource and social conditions are meeting standards, then there may be few changes to management. If, however, conditions need to be improved, then there may need to be several actions.

In allocating areas to opportunity classes and selecting associated management actions, managers must consider all of the costs: financial (personnel, materials, etc.), information (cost of gathering information necessary to implement), opportunity costs (foregone use or attribute, degraded experience or ecosystem), social costs, etc. They should also consider the benefits in terms of improved visitor experience and/or improved ecosystems. Some costs and most benefits are difficult to quantify, but should be evaluated qualitatively at least. The evaluation should be documented in writing.



Some questions that can guide the analysis are:

1. What user groups are affected and in what ways? Does it facilitate or restrict use by certain groups?
2. What values are promoted and which are diminished?
3. How does a particular alternative fit into regional or national supply and demand considerations?
4. Does the alternative contribute a unique kind of visitor experience with minimal impact?
5. What is the feasibility of managing the areas as prescribed, given constraints of personnel, budgets, etc.?

| A Sample of Some Management Actions | | |
|-------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biophysical | Modify location of use | Shift use to areas where there will be less impact <ul style="list-style-type: none"> • Areas with resistant surfaces or resistant/resilient • Areas with resistant/resilient vegetation rather than bare soil • Areas confined by topography – so that they cannot “creep” expansion |
| | Limit or reduce use | Tends to be ineffective when implemented alone (needs to be part of a package of strategies) |
| | | Tends to work better on areas with light use than in areas with heavy use |
| | Modify type of use | Overnight versus day use |
| | | Method of travel (pack animals, horses, hiking, etc.) |
| | | Size of group – not particularly effective for reducing bio-physical impacts |
| | Modify visitor behavior (regulation and/or education) | Encourage stove use and discourage open fires |
| | | Firewood gathering restrictions (dead and down instead of live or dead standing) |
| | | Dish/clothing/personal washing restrictions (away from stream with disposal pit) |
| | | Management of human waste (onsite practices, pack paper out, pack it all out) |
| | Modify timing of use | Encourage use of surfaces that are best for travel and camping, to maintain resource condition |
| | | Close areas during breeding, nesting, waterlogged conditions, heavy runoff/sedimentation conditions, etc. |

| | | |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Social (visitor encounters and visitor conflicts) | Increase resistance of resource | Discourage use during resource damaging periods via the information provided on use |
| | | Usually via engineering hardened surfaces (don't want to introduce non-native species or modify ecosystems) |
| | | Provide camping facilities (fire pits, tent pads, etc.) |
| | | Provide toilet facilities |
| | | Improve trail design (up to putting in hardened trail surfaces) – proper location, runoff management, steps, etc. |
| | | Provide stream crossings |
| | Maintain or restore resource | Treats symptoms, not cause – best results when combined with other strategies that reduce cause |
| | | Maintain trails – erosion control, limit widening or multi-trails |
| | | Maintain campsites – litter, ash removal, close informal trails, provide formal access to water, etc. |
| | | Rehabilitate/restore impacted areas – useless unless cause is addressed |
| | Modify location of use | Provide smaller more dispersed campsites |
| | | Provide more trails |
| | Limit or reduce use | Implement permit systems |
| | | Limit length of stay – usually combined with permit |
| Require certain skills or equipment | | |
| Charge a fee | | |
| Encourage or discourage use in some places – basically through the information provided | | |
| Make access more difficult or easier – close access trails or roads, remove bridges | | |
| Modify type of use | Provide, improve, or remove visitor facilities | |
| | Different sites for different sizes and types of groups | |
| Modify visitor behavior (regulation and/or education) | Encourage noise reduction | |
| | Encourage trail etiquette | |
| | Encourage reduction in light pollution | |
| | Encourage “leave no trace” hiking and camping | |
| Modify visitor expectations | Primarily through information material provided | |
| Adapted from Eppley Institute for Parks and Public Lands. n.d | | |

Step 8: Implement Management Actions and Monitor Conditions

PURPOSE

- To implement a management program to achieve the acceptable conditions
- To provide periodic, systematic feedback regarding the performance of the management program

PROCESS

- Periodically monitor condition of indicators (repeat of Step 4)
- Compare indicator conditions with standards (repeat of step 7)
- Analyze performance of the management actions

PRODUCT

- Summary of relationship between existing conditions and standards for all indicators in all opportunity classes
- Where necessary, recommendations of needed changes in management program in order to obtain satisfactory progress toward achieving standards

Usually the areas monitored and the timing of monitoring will have to be prioritized due to insufficient budget to monitor everything at “ideal” intervals. Priority situations that should be considered are areas where:

- Conditions were very close to standards at the time of the last assessment.
- Managers’ professional judgments indicate that rates of resource or social change are highest.
- The quality of the data base is poorest.
- The understanding of management action effects is poorest.
- There have been unanticipated changes in factors such as access, adjacent land uses, etc.

Application in NNP

In November and December of 2011, DAI supported a consultant who worked with personnel from NNP and WCS to develop a LAC approach for use in NNP. They proposed the following 10 step process:

- Step 1. Identify who will be involved, when
- Step 2. Identify current and planned uses, concerns and issues
- Step 3. Define and describe Tourism Management Zones (TMZs)
- Step 4. Select indicators of resource and social conditions
- Step 5. Inventory resource and social conditions using indicators
- Step 6. Specify standards for resource and social indicators for each TMZ
- Step 7. Allocate specific locations in the park to TMZs
- Step 8. Identify management actions
- Step 9. Implement management actions
- Step 10. Monitor indicators, compare to standards and repeat steps 8-10 (annually)

REFERENCES (except where noted, these references are supplied to participants on a CD)

Eppley Institute for Parks and Public Lands. n.d. Visitor Use Management Online Course

McCool, Stephen F., Roger N. Clark and George H. Stankey. 2007. An Assessment of Frameworks Useful for Public Land Recreation Planning. General Technical Report PNW-GTR-705. March 2007. United States Department of Agriculture. Forest Service. Pacific Northwest Research Station. 125 pp

National Park Service. 1997. VERP: The Visitor Experience and Resource Protection (VERP) Framework A Handbook for Planners and Managers. U.S. Department of the Interior, National Park Service, Denver Service Center. 103 pp. (The U.S. National Park Service's adaptation of LAC for use in National Parks)

Stankey, George H., David N. Cole, Robert C. Lucas, Margaret E. Petersen and Sidney S. Frissell. 1985. The Limits of Acceptable Change (LAC) System for Wilderness Planning. General Technical Report INT-176, Intermountain Forest and Range Experiment Station, Forest Service, United States Department of Agriculture, Ogden, UT. 39 pp. (The original paper establishing the LAC approach, including an application for a wilderness area in a National Forest.)

Proposed Tourism Management Zones for NNP

| Zones | Examples |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Nature Walk* | Isumo Trail, Buhoro Trail, Irebero Trail, Umugote Trail |
| Bird Watching* | Karamba Trail, Kamiranzovu Trail |
| Trekking* | Congo-Nile Divide Trail, Bigugu Trail?, Ngabwe Trail? |
| Engineered Attractions* | Canopy Walk, Shared trail up to the Canopy Walk? |
| Motorized Sightseeing* | Gisakura-Kitabi Road, Pindura Road |
| Primate Tracking | Cyamundongo Forest, Gisakura Forest, Umuyove side trails |
| Developed | Uwinka Visitor Center, Uwinka Campground, proposed sites |
| The zones marked with an “*” are defined as corridors. The other two zones (Primate Tracking and Developed) are polygons. | |

Corridors are defined as a set distance from the centerline or the designed edge of the trail or road. What is a reasonable distance for trails? (Some factors: What is the design width of trails? How far off the trail might visitors have a physical/tactile impact?)

| Comparison of Trail Characteristics | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------|--------------------|--------------------|-------------------|----------------------|-----------------------|----------------|-------------------------------|
| Zones | General Description | | Re-source | Visitor Experience | | | Management Conditions | | |
| | Guides | Off-trail Use | Impact on Resource | Landscape | Physical Exertion | Encounters w/ Others | Human Structures | Information* | Encounters w/ Non-Guide Staff |
| Nature Walk | Yes | No | Min | Natural | Mod | Mod | Basic | P GB GM | Mod |
| Bird Watching | Yes | Min | Min | Natural | Mod | Low | Basic | P GB GM | Low |
| Trekking | Yes | <i>Min</i> | <i>Min</i> | <i>Natural</i> | <i>High</i> | <i>Low</i> | <i>Basic</i> | <i>P GB GM</i> | <i>Low</i> |
| Engineered Attractions | Yes | No | Local Signif | Natural | Mod | High | Signif | GB GM | Mod |
| Motorized Sightseeing | <i>No</i> | <i>No</i> | <i>Signif</i> | <i>Modified</i> | <i>Low</i> | <i>High</i> | <i>Signif</i> | <i>S</i> | <i>Low</i> |
| Primate Tracking | Yes | Signif | Min | Natural | Mod | None | Basic | P GB GM S | Low |
| Developed | <i>No</i> | <i>No</i> | <i>Signif</i> | <i>Modified</i> | <i>Low</i> | <i>High</i> | <i>Signif</i> | <i>P S D</i> | <i>High/Low†</i> |
| Notes The non-italicized characteristics are in the proposed descriptions. The <i>italicized</i> characteristics are proposed by the consultant. * P=Pamphlets, GB=Guide Briefing, GM=Guide Management, S=Signage, D=Displays † May be high at park run facilities, but low at concession run facilities. | | | | | | | | | |

ARE THESE SUFFICIENT?

| Category | Nature Walk Zone | Bird Watching Zone | Engineered Attractions Zone | Primate Tracking Zone |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Description | This zone is comprised of trail corridors used primarily for guided nature walks. No off-trail visitor use is allowed in this zone. | This zone is comprised of trail corridors used primarily for guided bird watching. Minimal off-trail visitor use to improve bird viewing is allowed in this zone. (This zone is restricted to bird watching in the mornings and evenings, but may be used for nature walks from mid-morning to mid-afternoon. During non-bird-watching uses, no off-trail use is allowed and the visitor experience is managed to meet the Nature Walk Zone conditions.) | This zone is comprised of trail corridors used for access to engineered attractions (e.g., canopy walks and zip lines) and the corridors through which engineered structures pass. Guides are required in this zone. No off-trail or off-route visitor use is allowed in this zone. (During dawn and dusk, some of the structures in this zone may be used for bird watching, at which time the visitor experience is managed to meet the Bird Watching Zone conditions.) | This zone is comprised of the areas (polygons) used for guided primate habituation, tracking and viewing. Significant off-trail visitor use to improve primate viewing is allowed in this zone. |
| Biophysical Resource Conditions | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. <i>Minor modifications of resources outside of the immediate trail corridor can be made for essential visitor and park operation needs, but they are made in a way that harmonizes with the natural environment.</i> | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. Minor modifications of resources outside of the immediate trail corridor can be made to improve bird viewing and for park operation needs, but they are made in a way that harmonizes with the natural environment. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. Significant, localized resource modifications associated with engineered structures may be evident in the immediate corridor. There is minimal visible impact on resources outside of the immediate corridor. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridors. There is <u>moderate</u> visible impact on resources from visitor use and tracking camps outside of the immediate corridor. |
| Visitor Experience/ User Contact | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is moderate. | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is low. | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they experience this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is high. | This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this area. Visitors will not encounter other visitors (outside of those in their own group) in this zone. |

| Category | Nature Walk Zone | Bird Watching Zone | Engineered Attractions Zone | Primate Tracking Zone |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management Conditions | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. <u>Trail guide pamphlets</u> , guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges, boardwalks, bird towers and benches) are the only facilities in this zone. <u>Trail guide pamphlets</u> , guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) and the engineered structures themselves are the only facilities in this zone. Guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. Information pamphlets and signage as well as guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. |

Notes:

Items in *italics* in the descriptions are components of the descriptions upon which the group did not reach consensus.

Underlined items are additions suggested by the consultant as he transcribed the descriptions from the workshop flipcharts.

| Category | Trekking Zone | Motorized Sightseeing Zone | Developed Zone |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Description | <p>This zone is comprised of trail corridors used primarily for guided _____</p> <p>_____ off-trail visitor use is allowed in this zone [to] _____</p> <p>Other (e.g., camping?) _____</p> | <p>This zone is comprised of road corridors used primarily for _____</p> <p>_____ off-road visitor use is allowed in this zone [to] _____</p> <p>Other _____</p> | <p>This zone is comprised of the areas (polygons) where major visitor and administrative facilities are located. The park visitor center, research station, developed campgrounds, and concessionaires facilities are included in the developed zone.</p> <p>_____ off-trail visitor use is allowed in this zone [to] _____</p> <p>Other _____</p> |
| Biophysical Resource Conditions | <p>The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is _____ visible impact on resources outside of the immediate corridor. <i>Minor modifications...</i></p> | <p>The areas in this zone are predominately _____ [guided/unguided?]</p> <p>There is _____ visible impact on resources outside of the immediate corridor.</p> <p>_____ modifications of resources outside of the immediate corridor _____</p> | <p>The areas in this zone are predominately _____ [guided/unguided?]</p> <p>There is _____ visible impact on resources outside of the immediate area.</p> <p>_____ modifications of resources outside of the immediate area</p> |

| Category | Trekking Zone | Motorized Sightseeing Zone | Developed Zone |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------|
| Visitor Experience/ User Contact | <p>This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a <i>multi-day</i> block of time, have <i>moderate</i> outdoor skills, and expend <i>high</i> physical exertion to use this area. The probability of encountering other visitors (outside of those in their own group) is _____</p> | SEE EXAMPLES BELOW | SEE EXAMPLES BELOW |
| Management Conditions | <p>Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in <i>most of</i> this zone. [camping] _____</p> <p>_____</p> <p>_____</p> <p>Trail guide pamphlets, guide briefings and guide group management is the main visitor management opportunity in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is _____.</p> | SEE EXAMPLES BELOW | SEE EXAMPLES BELOW |

| Examples of Opportunity Class Descriptions, adapted from Arches National Park and Daniel Boone National Forest in the USA | | | |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category | Motorized Sightseeing Zone | Developed Zone | Concentrated Use Zone |
| General Description | The motorized sightseeing zone is a substantially developed area. | This zone includes areas with major visitor and administrative facilities. The park visitor center, headquarters, and administrative areas, campground, and picnic area are included in the developed zone. | This area consists primarily of developed trailhead areas, but can include other areas of high visitation. These may include permanent facilities such as parking areas, toilet buildings, campsites, information boards, and roads. These areas may be hardened to withstand heavy visitor use. |
| Biophysical Resource Conditions | The visitor is clearly aware that he is on a human-made structure, but surrounded by views of nature. Resources can be modified for essential visitor and park operational needs. The Park Service's tolerance for resource degradation in this zone is moderate. | Although buildings, structures, and the signs of people are pre-dominant, there are natural elements present. Resources are modified for visitor and park operational needs. The Park Service's tolerance for resource degradation here is relatively high. | Characterized by natural landscapes obviously modified to accommodate heavy use. |
| Visitor Experience/ User Contact | The paved roadways and associated developments in this zone are used by visitors for touring the park, enjoying scenic overlooks and interpretive media, and gaining access into other park zones. Visitor attractions are convenient and easily accessible. The visitor experience is dependent on a vehicle or bicycle, involves driving along a well-maintained, paved road. Observing the natural environment is important, and there may be a sense of adventure, but there is little need for visitors to physically exert themselves, apply outdoor skills, or spend a long time in the area. The probability of encountering other visitors is very high, and moderate for encountering NPS staff; many visitors may be present. Some trails and most facilities would be accessible in this zone. | The facilities are convenient and easily accessible; there is little need for visitors to physically exert themselves, apply outdoor skills, or make a long time commitment to see the area. Opportunities for adventure are relatively unimportant. Many of these areas offer opportunities for social experiences, and the probability of encountering other visitors or NPS staff is very high. Most facilities would be accessible to visitors with disabilities, and there might be some accessible trails. | There is little opportunity for solitude or isolation from the sights and sounds of human use. This zone contains areas of concentrated use resulting in a high probability of contacts with other visitors. There is little opportunity for risk and challenge. Self-reliance and outdoor skills are of little or no importance. There is a greater opportunity for those with disabilities in this zone. |
| Management Conditions | Intensive management is provided in the motorized sightseeing zone to ensure resource protection and public safety (e.g., with fences, intensive law enforcement, and restrictions on visitor activities). | Visitors and facilities are intensively managed in this zone for resource protection and safety purposes (e.g., with fences, intensive law enforcement, and restrictions on visitor activities). | Managerial presence is high. Signs are prevalent, especially on information boards and directional signs for trails. On-site visitor strategies are used for visitor education, safety and resource protection. These strategies may include education and interpretation. High probability of visitors seeing Forest Service management personnel/volunteers. Structures are provided for resource protection, visitor safety, and visitor convenience reasons. |

| What should be monitored so that we can better manage tourism impacts? | | Nature Walk | Bird Watching | Trekking | Engineered Attractions | Primate Tracking | Motorized Sightseeing | Developed |
|------------------------------------------------------------------------|--|-------------|---------------|----------|------------------------|------------------|-----------------------|-----------|
| Resources | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Visitor Experience | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Management Conditions | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| What should be monitored so that we can better manage tourism impacts? | | Nature Walk | Bird Watching | Trekking | Engineered Attractions | Primate Tracking | Motorized Sightseeing | Developed |
|------------------------------------------------------------------------|-----------------------------------------|-------------|---------------|----------|------------------------|------------------|-----------------------|-----------|
| Resources | Erosion | X | X | X | X | X | | |
| | Animals sighted or heard | X | X | X | X | X | | |
| | Vegetation Trampling | | | X | | X | | X |
| | Informal trails | | | X | | X | X | X |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Visitor Experience | Encounters with other groups | X | X | X | X | X | | |
| | Litter | X | X | X | X | X | X | X |
| | Human waste | | | X | | | X | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Management Conditions | Does visitor have adequate information? | X | X | X | X | X | X | X |
| | Condition of facilities | X | X | X | X | X | X | X |
| | Condition of erosion control structures | X | X | X | X | X | | X |
| | Vandalism | | | X | | | X | X |
| | | | | | | | | |
| | | | | | | | | |

Draft List of LAC Indicators from Literature Review Applicable to Nyungwe National Park

CAMPSITE CONDITIONS

Campsite Condition Class Approaches

- Number of campsites by condition class

Multiple Parameters Approaches (per campsite)

- Size of campsite use area
- Percent of campsite area with bare ground
- Number of trees damaged or stripped of limbs by people
- Number of trees girdled by people
- Number of trees damaged or stripped of limbs by damage classes
- Number of tent sites with visitor-made trenching
- Number of fire rings
- % of trees with exposed roots
- Pieces of litter in and around campsite (within a defined distance from edge of campsite)
- Number of occurrences of unburied human waste in and around campsite (within a defined distance from edge of campsite)
- Number of incidents of vandalism
- Number of structures in need of repair

TRAIL CONDITIONS

Trail Condition Class Approaches

- Number of trails by condition class
- % of trail length by condition class

Problem Assessment (a.k.a. Census or Tally) Approaches

- Number of sites of "x" (1, 2 or 3 depending on condition variable) meters in length or more per kilometer:
 - where the trail has been widened beyond design criteria
 - where vegetation encroachment hampers travel
 - with defined rill erosion (≥ 5 cm in width)
 - with active erosion (specifically defined by the protocol)
 - with standing water
 - that are always muddy (2 cm impression with step)
 - with multiple treads
- % of trail kilometers:
 - where the trail has been widened beyond design criteria
 - where vegetation encroachment hampers travel
 - with defined rill erosion (≥ 5 cm in width)
 - with standing water
 - that are always muddy (2 cm impression with step)
 - with multiple treads
- Number of sites per kilometer with exposed roots
- Pieces of litter/kilometer
- Number of structures in need of repair

Point Sampling Approaches (measured at each sample site)

- Maximum tread incision (depth of tread below surrounding ground)
- Cross-sectional area of tread below surrounding ground
- Trail width
- Encroaching vegetation
- Muddy
- Standing water
- Root exposure
- Litter

OFF-TRAIL CONDITIONS (Primate Tracking Zone)

- Number of non-constructed/user-made trails
- Condition of non-constructed/user-made trails
- % ground cover (vegetative and litter)
- Species composition
- Incidence of exotic species

- Incidence of “indicator” species (those most sensitive to trampling)

SOCIAL CONDITIONS

Encounters

- Number of encounters/day/group on trail or in area with other groups
- Number of encounters/day/group on trail or in area with park personnel (other than the group guide), trail workers or researchers
- Number of other groups/day that pass campsite

Quality of Visit

- % of total comments containing a specific complaint(s)
- Average number of visitors/day per trail or primate area
- Mean, median and distribution of number of visitors/group
- Visitor surveys

WATER QUALITY

- Fecal coliform counts
- Incidence of tourist debris in or on the banks of streams or wetlands
- Incidence of wetland or riparian indicator species
- Incidence of fish kills

WILDLIFE

Census Approaches

- Species heard or seen during activity
 - By guide
 - By client
- % of visitors who report seeing wildlife
- Incidence of indicator species heard or seen during activity
- Incidence of habituated primate “pests”

Sampling Approaches

- Species composition
 - Transects
 - Bird counts
- Habitat condition

INFORMATION AVAILABILITY/QUALITY

- Visitor surveys
- Number of observed violations of rules/recommendations
- Days during which printed material is not available
- Visibility of signs
- Condition of signs

These indicators were primarily drawn from two literature reviews of indicators used in LAC frameworks in the United States:

Manning, Robert E. 2007. Parks and Carrying Capacity: Commons Without Tragedy. Appendices A and B. Island Press, Washington.

Watson, Alan and David Cole. 1992. LAC Indicators: An Evaluation of Progress and List of Proposed Indicators. Wilderness Management Research Unit, Intermountain Research Station, Missoula, MT. United States Forest Service, USDA

In addition, several LAC and other visitor monitoring manuals were consulted, including those for Daniel Boone National Forest, Dixie National Forest, Galapagos National Park, Great Smokey Mountains National Park, and Steens Mountain Wilderness as well as general guidance documents for visitor impact monitoring produced by the United States Forest Service, the United States National Park Service and Utah State University.

APPENDIX E: LAC WORKSHOP OUTCOMES, APRIL 16-18, 2012

Identified Issues and Concerns with Tourism Impact in NNP

Category 1

Erosion
Habitat Degradation
Wildlife Behavior Change

Category 2

Litter
Habitat Destruction
Human-Wildlife Disease Transmission
Falling Trees
Lack of Information on What to Expect
Large Groups
Noise from Main Road

Category 3

Negative Change in Local Culture
Steep Trails
Landslides
Undeveloped Campground

Category 4

Unclean Trails
Availability of Primates
Wide Trail to Canopy Walk

These issues and concerns were identified in a small group activity on April 16. On April 17, a prioritization exercises (using a voting approach), resulted in grouping into 4 categories, with Category 1 representing the highest priority issues and concerns (receiving the most votes) and Category 2 being the lowest priority (receiving no votes).

Tourism Management Zones

Participants reviewed the work previously done on identifying and defining Tourism Management Zones. They concluded that the 7 zones that had been previously proposed were adequate:

- Nature Walk
- Bird Watching
- Engineered Attractions
- Trekking
- Primate Tracking
- Developed
- Motorized Sightseeing

The participants revised the previously proposed definitions, and where needed developed new definitions. The resulting definitions are presented in the following pages.

Nyungwe National Park Tourism Management Zones

| | Nature Walk | Bird Watching | Engineered Attractions | Trekking | Primate Tracking | Developed Zone | Motorized Sightseeing |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Description | This zone is comprised of trail corridors used primarily for guided nature walks. On rare occasions, off-trail visitor use to improve wildlife viewing is allowed in this zone. | This zone is comprised of trail corridors used primarily for guided bird watching. Minimal off-trail visitor use to improve bird viewing is allowed in this zone. | This zone is comprised of trail corridors used for access to engineered attractions (e.g., canopy walks and zip lines) and the corridors through which engineered structures pass. Guides are required in this zone. On rare occasions, off-trail visitor use to improve wildlife viewing is allowed in this zone. | This zone is comprised of trail corridors and associated campsites used primarily for guided, multi-day nature walks. On rare occasions, off-trail visitor use to improve wildlife viewing is allowed in this zone. | This zone is comprised of the areas (polygons) used for guided primate habituation, tracking and viewing. Significant off-trail visitor use to improve primate viewing is allowed in this zone. | This zone is comprised of the areas (polygons) where major visitor and administrative facilities are located. Park facilities such as the visitor center, education center, research station and developed campgrounds as well as concessionaires' facilities are located in this zone. Off-trail visitor use is allowed in this zone and visitors are free to move about in the zone without a guide. | This zone is comprised of road corridors used for public and private transport. Guides are not required in this zone. No off- road visitor use is allowed in this zone. |

| | Nature Walk | Bird Watching | Engineered Attractions | Trekking | Primate Tracking | Developed Zone | Motorized Sightseeing |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biophysical Resource Conditions | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. Minor modifications of resources outside of the immediate trail corridor can be made for essential visitor and park operation needs, but they are made in a way that harmonizes with the natural environment. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. Minor modifications of resources outside of the immediate trail corridor can be made to improve bird viewing and for park operation needs, but they are made in a way that harmonizes with the natural environment. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor, with the exception of significant, localized resource modifications associated with engineered structures. With the exception of the engineered structures, only minor modifications of resources outside of the immediate trail corridor can be made for essential visitor and park operation needs, but they are made in a way that harmonizes with the natural environment. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridor. There is minimal visible impact on resources outside of the immediate corridor. Minor modifications of resources outside of the immediate trail corridor can be made for essential visitor and park operation needs, but they are made in a way that harmonizes with the natural environment. | The areas in this zone are predominately natural with some evident resource modifications within the immediate trail corridors. There is moderate visible impact on resources from visitor use and tracking camps outside of the immediate corridor. | The areas in this zone have been highly modified from their natural state. The zone, however, is generally surrounded by areas that are predominately natural. Landscaping is allowed in this zone, but it should be done with species native to NNP. | The areas in the immediate road corridor in this zone have been highly modified from their natural state. The areas outside of the immediate road corridor, however, are predominately natural, with moderate visible impact on resources. Moderate modifications of resources outside of the immediate road corridor can be made for road maintenance and essential visitor and park operation needs, but where feasible they are made in a way that harmonizes with the natural environment. |

| | Nature Walk | Bird Watching | Engineered Attractions | Trekking | Primate Tracking | Developed Zone | Motorized Sightseeing |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Visitor Experience | <p>This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this zone. The probability of encountering other visitors (outside of those in their own group) is moderate. (Sometimes the trails in this zone are used for bird watching. In these instances, the visitor experience is managed to the Bird Watching Zone conditions.)</p> | <p>This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this zone. The probability of encountering other visitors (outside of those in their own group) is low. (This zone is restricted to bird watching in the mornings and evenings, but may be used for nature walks at other times. During non-bird-watching uses, the visitor experience is managed to meet the Nature Walk Zone conditions.)</p> | <p>This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they experience this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this zone. The probability of encountering other visitors (outside of those in their own group) is high. (During dawn and dusk, some of the structures in this zone may be used for bird watching, at which time the visitor experience is managed to meet the Bird Watching Zone conditions.)</p> | <p>This zone provides a sense of being immersed in a natural landscape and feels distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a multi-day block of time, have moderate outdoor skills, and expend high physical exertion to use this zone. The probability of encountering other visitors (outside of those in their own group) is low. (Sometimes the trails or portions of the trails in this zone are used for single day activities such as nature walks and bird watching. In these instances, the visitor experience is managed to the Nature Walk Zone or Bird Watching Zone conditions as appropriate.)</p> | <p>This zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Visitors can see, touch, smell and hear park resources as they walk in this zone. Visitors must commit a block of time, have some outdoor skills, and expend moderate physical exertion to use this zone. Visitors will not encounter other visitors (outside of those in their own group) in this zone.</p> | <p>This zone provides a sense of being in a human made environment with comforts and conveniences, but surrounded by a natural landscape. Visitors can see, touch, smell and hear park resources when they are in this zone. They also have an opportunity to access park information. Visitors do not necessarily need to commit a block of time, nor do they need to have outdoor skills or expend much physical exertion to use this zone. This zone offers opportunities for social experiences and the probability of encountering other visitors is very high.</p> | <p>This zone provides a sense of being in a human made environment that passes through a natural landscape. Visitors can see and learn about park resources as they drive or ride in this zone. There may be limited opportunities to stop and get out of their vehicles to see, smell and hear park resources. Visitors can experience the Park in this zone without committing any additional time to their travel, nor do they need to have outdoor skills or expend any physical exertion to use this zone. The probability of encountering other visitors is very high.</p> |

| | Nature Walk | Bird Watching | Engineered Attractions | Trekking | Primate Tracking | Developed Zone | Motorized Sightseeing |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management Conditions | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. Trail guide pamphlets, guide briefings and guide group management are the main visitor management opportunities in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges, boardwalks, bird towers and benches) are the only facilities in this zone. Trail guide pamphlets, guide briefings and guide group management are the main visitor management opportunities in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) and the engineered structures themselves are the only facilities in this zone. Information pamphlets, guide briefings and guide group management are the main visitor management opportunities in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) and basic campsites (all with fire rings and latrines and some with other facilities such as with cement pads, tent platforms, bungalows, bucket showers, and trash cans). Trail guide pamphlets, guide briefings and guide group management are the main visitor management opportunities in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is moderate. | Unpaved, maintained trails with associated basic structures (e.g., signs, handrails, bridges and benches) are the only facilities in this zone. Information pamphlets and signs as well as guide briefings and guide group management are the main visitor management opportunities in this zone. The probability of encountering park staff (other than the accompanying guide), trail workers or researchers is low. | Extensive construction including buildings, sanitary facilities, roads, campgrounds and paved and unpaved trails are in this zone. Information pamphlets, signs, displays and programs are the main visitor management opportunities in this zone. The probability of encountering park staff is very high at park facilities, but may be low at concessionaire facilities. | Paved and unpaved, maintained roads with associated structures (e.g., signs, bridges, drainage structures, pull-outs, and viewpoints) as well as shops and sanitary facilities may be found in this zone. Road guide pamphlets and signs are the main visitor management opportunity in this zone. The probability of encountering park staff is low. |

Results of “What should we monitor?” Exercise

| | | Nature Walk | Bird Watching | Trekking | Engineered Attractions | Primate Tracking | Motorized Sightseeing | Developed |
|------------------------------------------------------------------------|---------------------------------------------------|-------------|---------------|----------|------------------------|------------------|-----------------------|-----------|
| What should be monitored so that we can better manage tourism impacts? | | | | | | | | |
| Resources | <i>Litter</i> | X | X | X | X | X | X | X |
| | <i>Habitat Degradation</i> | X | X | X | X | X | X | X |
| | <i>Human Wildlife Disease Transmission</i> | X | X | X | X | X | | |
| | <i>Trail Condition</i> | X | X | X | X | X | X | X |
| | Erosion | X | X | X | X | X | | |
| | Availability of Animals | | X | | | X | | |
| | Incidence of off-trail and off-road use | X | X | X | X | | X | X |
| | Animal/Insect Killing | X | X | X | X | X | X | X |
| | Wildlife Behavior Change | | X | | | X | | |
| Visitor Experience | <i>Group Size</i> | X | X | X | X | X | X | X |
| | Group Encounters | X | X | X | X | X | X | X |
| | Visitor Satisfaction | X | X | X | X | X | X | X |
| | Physical Fitness | X | X | X | | X | | |
| | | | | | | | | |
| Management Conditions | <i>Availability of Information</i> | X | X | X | X | X | X | X |
| | Impacts on Local Culture | X | X | X | X | X | X | X |
| | Condition of Structures | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Items in <i>bold italics</i> were common to both small groups. | | | | | | | | |

What is Currently Monitored? (Plenary Session Brainstorming)

- Number, type and location of illegal activities
- Chimpanzee Data
 - Diet
 - Reaction to clients
 - Distance from clients
 - Numbers viewed
 - Breeding
 - Health condition (observable traits)
 - Nesting
 - Identification of individuals – age, sex, status
 - Length of client travel time
- Guide Log Book
 - Name, nationality, residence and receipt numbers of clients/group
 - Comment (open-ended)
- Visitor Comment Book (open-ended)
- Botanical Survey
 - Monthly, fixed transects, three altitude zones
 - 10 year, entire park
- Bird Survey, fixed transect
- Mammal Survey, fixed transect
- Camera traps on some hiking trails
- Various short-medium term research projects

Preliminary Proposals for Indicators (Outcome of Small Group exercise)

| General Indicator | Specific Indicators |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Campsite Conditions | Number of fire rings |
| | Number of tent sites |
| | Number of structures |
| | Pieces of litter in and around campsite |
| | Number of trees damages or stripped of limbs by people |
| Trail Conditions | Number of sites per kilometer: <ul style="list-style-type: none"> ○ Where trail is wider than design criteria ○ Where vegetative encroachment hampers travel ○ With standing water ○ With active erosion ○ That are always muddy ○ With exposed roots |
| | Number of structures per kilometer in need of repair |
| | Number of pieces of litter per kilometer |
| Encounters | Number of encounters/day/group on trail or in area <ul style="list-style-type: none"> ○ With park personnel (other than group guide) ○ Trail workers ○ Researchers |
| | Visitor Survey |
| Group Size | Standard: 8 people/group/guide |
| | % of groups with more than 8 people per day, data from guide report |
| Availability of | Rules and Regulations |

| General Indicator | Specific Indicators |
|----------------------|----------------------------------------------------|
| Information | Visitor Survey |
| | Visibility of signs |
| | Availability of maps |
| | Education centers |
| Visitor Satisfaction | % of total visitor comments containing a complaint |
| | Visitor Surveys |

APPENDIX F: RESULTS OF LAC FOR NNP WORKING SESSION, APRIL 19, 2012

The following were in attendance at the meeting:

| <u>Name</u> | <u>Organization</u> |
|-------------------------|---------------------|
| Dushimimana Jules Cesar | NNP |
| Gakima Jean Baptiste | WCS |
| Imanishimwe Ange | NNP |
| Lane Krahll | DAI Consultant |
| Mugabe Robert | NNP |

The purpose of the session was to review the results of the previous 3-day workshop and:

- Select LAC indicators for each Tourism Management Zone
- Define the parameters for each indicator.

Table 1 presents the general indicators selected by the working group for each Tourism Management Zone. The table also shows the source of information for each indicator. Table 2 presents the parameters/definitions that were identified for individual indicators (some of these were identified by the consultant after the meeting).

The group concurred with the workshop outcome that a Problem Assessment approach to trail condition would be the best approach for NNP to pursue. We discussed at length, however, the pros and cons of using a “tally” approach, where each incident is merely tallied on the report form, versus a measured approach, where, using a measuring wheel, the start and end of each incident is recorded. The latter approach provides more management information in that it locates and gives the magnitude (length) of each incident. The group felt that having location and magnitude information would be worth the extra time it would take to record such information during the field inspection, but that using a “start and end” methodology would not necessarily provide useful information for describing the location of observed incidents to trail workers. Trail workers do not think of the trails in terms of kilometers, so that say, “there is an erosion problem 1.75 kilometers from the trail head” is not as useful as saying, “there is an erosion problem between the first and second bridges on the trail right after the trail starts to head downhill to the second bridge.” Therefore, the group decided to use a “tally” approach, but to tally by row with two extra columns: one giving the location of the incident and the other giving an estimate of its length, where appropriate. An example of how the form may look is presented in Figure 1.

Next Steps:

- Write data collection protocols.
- Create data field forms.
- Create “Guide Report Form” (to cover all types of activities)
- Create “Visitor Feedback Form” (activity specific)
- Field test protocols and forms

Table 1. General indicators for each Tourism Management Zone

| Zone | General Indicators | Source of Information |
|-----------------------|-----------------------------------------------------------------------------|-------------------------------------------|
| Nature Walk | Trail Conditions | Annual trail inspection |
| | Group Size | Guide Report Form* |
| | Group Encounters | Guide Report Form* |
| | Availability of Information | Visitor Feedback Form** |
| | User Satisfaction | Visitor Feedback Form** |
| | Primate Counts | Guide Report Form* |
| Bird Watching | Trail Conditions | Annual trail inspection |
| | Group Size | Guide Report Form* |
| | Group Encounters | Guide Report Form* |
| | Availability of Information | Visitor Feedback Form** |
| | User Satisfaction | Visitor Feedback Form** |
| | Endemic Bird Counts | Guide Report Form* |
| Trekking | Trail Conditions | Annual trail inspection |
| | Campsite Conditions | Annual campsite inspection |
| | Group Size | Guide Report Form* |
| | Group Encounters | Guide Report Form* |
| | Availability of Information | Visitor Feedback Form** |
| | User Satisfaction | Visitor Feedback Form** |
| | Primate Counts | Guide Report Form* |
| Primate Tracking | Trail Conditions | Annual trail inspection |
| | Group Size | Guide Report Form* |
| | Group Encounters | Guide Report Form* |
| | Availability of Information | Visitor Feedback Form** |
| | User Satisfaction | Visitor Feedback Form** |
| | Encounters with target primates | Guide Report Form* |
| Motorized Sightseeing | Litter | Monthly inspection |
| | Conditions of structures | Monthly inspection |
| | Number and condition of user-made trails at “high probability” sites† | User-made trail inventory, every 6 months |
| Developed | Trail Conditions (for sites that have unpaved trails >100 meters in length) | Annual trail inspection |
| | Litter | Monthly inspection |
| | Conditions of structures | Monthly inspection |
| | Availability of Information | Visitor Feedback Form†† |
| | Number of exotic plant species identified in the area | Annual inventory |

Notes:

*A Guide Report Form will be developed and will replace the current guide report log. The form will include all of the information currently in the log plus specific information necessary for analysis of visitor impacts. After returning from an activity, the guide will complete the form and give it on to the person in charge of data entry into the LAC data base. That person will then be responsible for filing the form.

**A Visitor Feedback Form will be developed and will replace the current visitor comment book. The guide will give a Form to each visitor during the activity briefing and ask the visitors to complete the form at the end of the activity and give it to him, to the reception desk or to their hotel desk (for those hotels that agree to assist the Park in this).

†“High probability” sites are those with user services, such as toilets and dust bins, as well as places beside the road where it is easy for cars to pull off and park (old construction staging areas or army camps).

††To be made available at conspicuous locations at Park and concessionaire facilities with a box into which completed forms can be placed (like a “suggestion box”).

Table 2. Parameters and descriptions of parameters for indicators.

| Indicator | Parameter | Unit | Description |
|-----------------------------|----------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trail Condition | Width | # of Sites/km | Width >1.5 meters for a distance >2 meters |
| | Water in Trail | | Water in trail for >1 meter in length with visible evidence of off-tread avoidance by users |
| | Muddy Area | % of Trail Length | Trail muddy for >1 meter in length with visible evidence of off-tread avoidance by users |
| | Active Erosion | | Defined trenching of >10 centimeters for >2 meters |
| | Vegetative Encroachment | # of Sites/km | Passage narrows to <0.5 meters, no length restriction |
| | Exposed Roots | | ≥1/2 of root exposed, no length restriction |
| | Structure in Need of Repair | | Any individual structure which the surveyor feels is in need of repair. |
| | Litter | # of Pieces/km | Tally each individual piece of litter picked up and put in the disposal bag during inspection |
| Campsite Condition | Size | m ² /Campsite | Use the variable radial transect procedure to determine the boundaries and areas of the campsite |
| | Undesignated Tent Sites | # of Incidents /Campsite | Tally every site off the designated tent pad and within the boundaries of the campsite where there is evidence that a tent has been pitched |
| | Undesignated Fire Rings | | Tally every fire ring encountered within the boundaries of the campsite except the designated fire ring |
| | Unburied Human Waste | | Tally each individual site within the campsite boundary and an area 3 meters outside of the boundary |
| | Structures | | Record each human-made structure by type within the campsite boundary |
| | Structures in Need of Repair | | Identify each structure that needs repair and briefly describe the kind of repair needed |
| | Litter | # of Pieces /Campsite | Tally each individual piece of litter picked up from within the campsite boundary and put in the disposal bag during inspection |
| Group Size | People | People/Group | Number of people in group as reported by guide on the Guide Report Form |
| Human Encounters | Other Group | # Other Group/Activity | Number of other groups encountered as reported by guide on the Guide Report Form. For activities leaving Uwinka on the same trail as the Canopy Walk, encounters are only tallied after the trail on which the activity occurs branches off from the trail to the Canopy Walk. |
| | Park Staff, Trail Workers, Researchers | #/Activity | Number of park staff, trail workers and researchers encountered during the activity, not including the guide for the group or guides with other groups they may encounter. For primate tracking, trackers associated with the activity are not counted. |
| Availability of Information | | | Data will come from the Visitor Feedback Form, but the group did not discuss the specifics of what data will be collected. |
| User Satisfaction | | | Data will come from the Visitor Feedback Form, but the group did not discuss the specifics of what data will be collected. |
| Primate Counts | Species | # of spp Observed/Activity | A list of the primate species in the park is on the Guide Report Form with a check box beside each name. The guide puts a check in the box for each species observed during the activity. |

| Indicator | Parameter | Unit | Description |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Endemic Bird Counts | Species | # of spp Observed/ Activity | A list of the endemic bird species in the park is on the Guide Report Form with a check box beside each name. The guide puts a check in the box for each species observed during the activity. |
| Encounters with Target Primates | Encounters | # of Encounters/ Activity | Number of encounters in group as reported by guide on the Guide Report Form |
| | Individual Animals | # of Individuals/ Encounter | For each encounter, the Guide Report Form will have a place for marking the number of individuals observed during the encounter |
| | Habituation | Level of Habituation/ Encounter | For each encounter, the Guide Report Form will have a place for marking the habituation of the observed group as Low, Medium or High (L, M, H). |
| Litter, non-campsite | Litter | kg/Zoned Area/ Inspection | Motorized Sightseeing: weight of all litter collected along the roadside of each individual road during the monthly inspection (is monthly too often for this, given the length of the roads?) |
| | | | Developed: weight of all litter collected within the boundary of each individual area designated as Developed during the monthly inspection |
| Condition of Structures | Cleanliness | # of Incidents/ Zoned Area | Identification of each structure on monthly inspection form with boxes for rating cleanliness and identifying "needs repair." Structures with low cleanliness rating should identify why. Need to develop some guidelines for cleanliness (L,M,H). Every structure needing repair should include a description of the nature of repair needed. |
| | Needs Repair | | |
| User-Made Trail Inventory | Number | # of trails/ High Probability Site | Before conducting the baseline inventory, the roads should be driven and every "high probability site" should be identified. High priority sites are sights where it is likely that motorists have parked and left their vehicles, such as places with toilets and/or dust bins and places beside the road where it is easy for cars to pull off and park (old construction staging areas or army camps). Inventories should be done every 6 months. Condition classes need to be determined, but will be based on standard classes use in the US.* |
| | Condition Class | Condition Class for each trail identified/ | |
| Exotic Plant Species | Number of Species | # of spp Identified/ Zoned Area | As identified by a competent botanist during an annual inventory |
| <p>*Possible Trail Condition Ratings:</p> <p>Class 1: Trail distinguishable; slight loss of vegetation cover and/or minimal disturbance of organic litter.</p> <p>Class 2: Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use area.</p> <p>Class 3: Vegetation cover lost and/or organic litter pulverized within the center of the tread, some bare soil exposed.</p> <p>Class 4: Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil widespread.</p> <p>Class 5: Soil erosion obvious, as indicated by exposed roots and rocks and/or gullying</p> | | | |

APPENIX G: CONTACTS

Rwanda Development Board

Ndikubwimana Innocent, Planning, Research and Monitoring Warden, NNP
Kambogo Ildephonse, Tourism Warden, NNP
Dushimimana Jules Cesar, Guide, NNP
Imanishimwe Ange, Guide, NNP
Mugabe Robert, Guide, NNP
Ntoyinkima Claver, Guide, NNP

DAI

Jim Seyler, Chief of Party, Nyungwe Nziza Project
Boaz Tumwesigye, Ecotourism Team Leader, Nyungwe Nziza Project

Wildlife Conservation Society

Fidele Ruzigandekwe, Monitoring and Evaluation
Michel Masozera, Country Director, Rwanda
Felix Mulindahabi, Biodiversity Specialist, Nyungwe National Park Project
Gakima Jean Baptiste, Biodiversity Specialist, Nyungwe National Park Project

USAID

Aimee Mpambara, Contracting Officer's Technical Representative, SSENPP

NNP Stakeholders

Eppa David, Nyungwe Forest Lodge
Faustine Mugabe, Nyungwe Top View Hill Hotel
Samson Kibet, Nyungwe Top View Hill Hotel
Karerwa Goreth, Nyungwe Top View Hill Hotel